SIEMENS

LEVEL METER

D 354

200 Hz to 1620 kHz with Frequency lock-in

Instructions for Operation

S45034-D354-B302-51-7618

SIEMENS AKTIENGESELLSCHAFT

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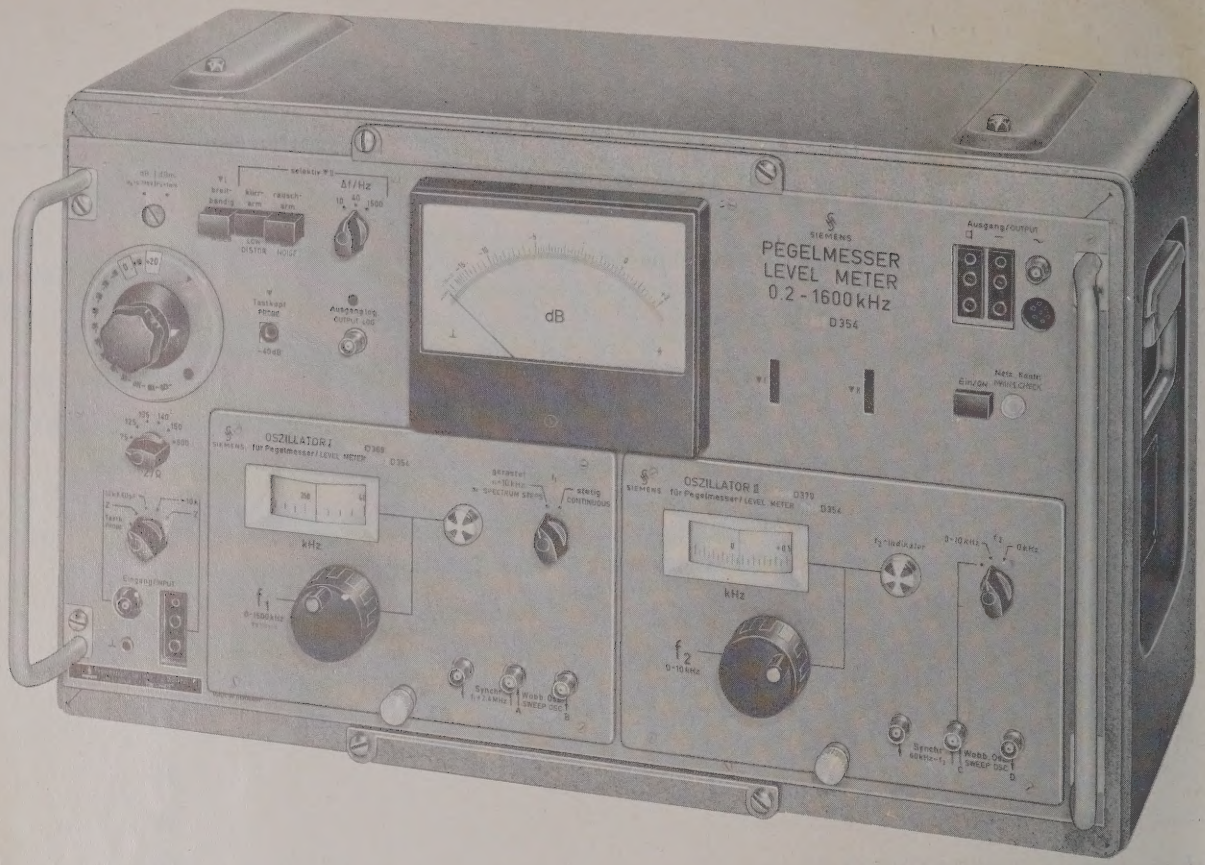
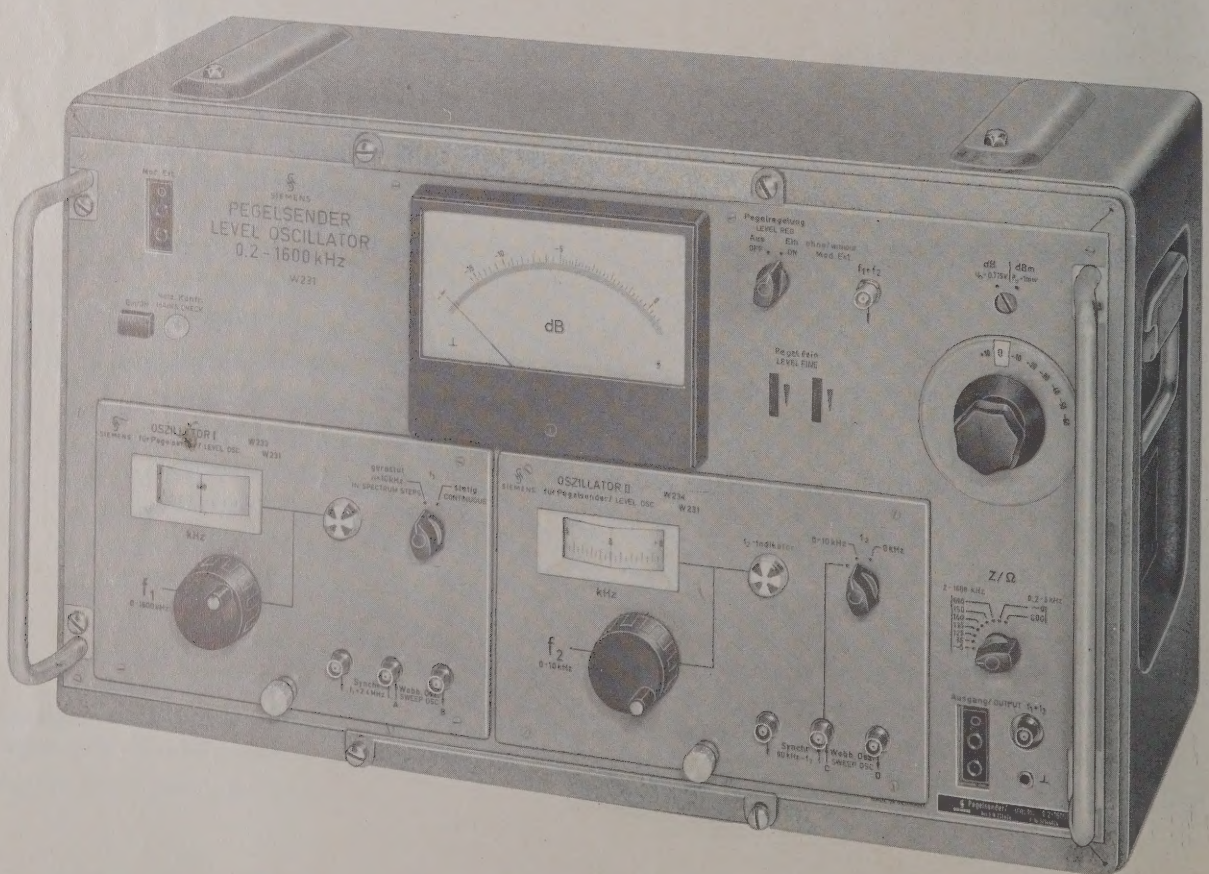


Level meter Type D 354 with the slide-in chassis Oscillator I Type D 369 and Oscillator II Type D 370



Level oscillator Type W 231 with the slide-in chassis Oscillator I Type W 233 and Oscillator II Type W 234

1. DESCRIPTION

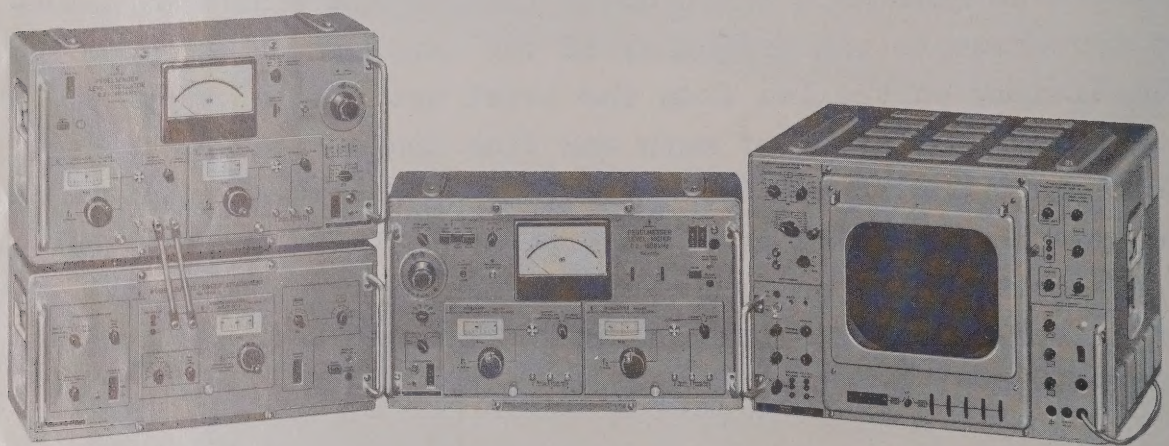
1.1 Application

Level meter and level oscillator, both fitted exclusively with silicon transistors, are constructed and coordinated in such a way as to produce complete measuring setups having particularly high level and frequency accuracy.

Level meter and level oscillator form a measuring setup for wideband level, attenuation and gain measurements in the audio and carrier frequency ranges from 200 Hz to 1620 kHz. Measurements can be made on a wideband or selective basis. With selective measurements the frequency of the level meter can be automatically controlled from the level oscillator and vice versa. Synchronization of main and fine tuning renders tuning operation on one of the two devices unnecessary and permits selective measurements to be made with all their advantages, yet retaining the ease common to wideband measurements. Frequency lock-in derived from a crystal spectrum results in high frequency accuracy of both devices.

As a result of its high frequency and level accuracy the measuring setup is particularly suited to development and testing of devices and systems in communications and electronics. Further, the measuring setup can be used when equipment is being lined up and, when it is a question of great accuracy, also in operational measurements. Its frequency range includes the CCITT groups and supergroups up to 1548 kHz and also all carrier systems and devices having up to 300 voice channels. Even in systems having a large number of voice channels (e.g. V 960, V 2700) many measurement problems fall within the range of the measuring setup. In the same way it covers the frequency range of modulation facilities of radio relay systems which are provided for the transmission of the basebands mentioned above and that of the corresponding balanced and coaxial carrier cables.

The measuring setup can be extended quite simply to form a sweep-frequency measuring setup. The internal oscillators are replaced by external ones which operate in the same frequency range. Their frequency is electronically swept. The sweep range is continually adjustable between ± 25 Hz and ±800 kHz. The oscillator units of the level oscillator continue to operate, providing the frequency markers necessary for the sweep operation, the accuracy of which corresponds to that of the level oscillator. The equipment necessary to sweep the measuring voltage is housed in the sweep-frequency attachment Type W 935, or G 2022 resp., which can be adapted by means of slide-in chassis for large and small sweep ranges depending upon the measuring problem in hand.



Sweep frequency measuring setup 200 Hz to 1.6 MHz
Left: Level oscillator, below: Sweep attachment, middle: Level meter, right: Level tracer

The level tracer Type D 346 displaying on the large screen a continuous trace representing some measured quantity as a function of frequency is connected to the specimen either directly or via the level meter. By adding to the display level and frequency lines, a coordinate system is traced out which is entirely free of tube distortion and parallax. This ensures a very accurate and reliable evaluation of the measured curve. When the level expansion is activated the sensitivity can be so increased that a change in level of 0.1 dB produces a deflection of 15 mm on the screen. Thus also sweep measurements in terms of tenths of a percent are easily possible.

If, on the other hand, level differences of up to 100 dB are to be represented on the screen, the level tracer will be connected to the dynamic output via the logarithmic amplifier. With the wide variation of the sweep range (±25 Hz to ±800 kHz), the large sweep frequency range (0.015 to 25 Hz and manual setting), and high frequency accuracy ($\frac{\Delta f}{f} < 10^{-5}$) all likely measurement problems can be solved in the frequency range of this sweep measurement setup with great time saving.

1.2 Electrical Data

Level Oscillator

Basic device W 231
with slide-in chassis oscillators I W 233 and II W 234

Frequency range ..... 200 Hz to 1620 kHz
set measuring frequency f_m ..... $f_1 + f_2$

Main setting t_1
with spectrum lock-in in 10-kHz steps ....0,...1620 kHz
or continuously ..... 0 to 1620 kHz

Fine setting f_2
with spectrum lock-in ..... 0 Hz
continuously ..... -3 to +13 kHz
smallest frequency increment readable ..... approx.20 Hz

Frequency error
f_1 and f_2 with spectrum lock-in .....$\pm 1 \cdot 10^{-5}$
f_1 with spectrum lock-in, f_2 continuously...$\pm 1 \cdot 10^{-5}$ ±30 Hz

Frequency change with ±10% mains voltage change
f_1 and f_2 with spectrum lock-in .....$\pm 2 \cdot 10^{-7}$
f_1 with spectrum lock-in, f_2 continuously... $\pm 2 \cdot 10^{-7}$ ±2 Hz

Automatic tuning
frequency tuning of the level meter from the level oscillator for ..... f_1 and f_2
frequency tuning of the level oscillator from the level meter for ..... f_1 and f_2

Automatic frequency sweep

with sweep attachment W 935/G 2022 and slide-in chassis f_1 Type W 940 for wide sweeps....±3 to ±800 kHz

with sweep attachment W 935/G 2022 and slide-in chassis f_2 Type W 941 for narrow sweeps..±25 to ±3000 Hz

mid-frequency, continuously adjustable from ..... 200 Hz to 1620 kHz

	Model	
	B 302: 0 dB≙0.775 V 0 dBm≙1 mV	B 602: 0 Np≙0.775V 0 Npm≙1 mV

Level output

for zero instrument mark, adjustable in steps of 10 dB, 1 Np	-60 to +10 dB -60 to +10 dBm	-6 to +1 Np -6 to +1 Npm
continuous variable about	15 dB	1.5 Np
smallest adjustable level	-75 dB -75 dBm	-7.5 Np -7.5 Npm

Level output error at 100 kHz

and the relative values: range switch 0 dB, 0 Np Instrument mark 0 and Z_i=Z=75Ω.....	..... ±0.1 dB	±0.01 Np
Attenuator error	±0.1 dB	±0.01 Np
Frequency response of the output level	±0.1 dB	±0.01 Np
Level output change with ±10% mains voltage variation	±0.03 dB	±0.003 Np
Typical total level error for Z_i=Z=75Ω, coaxial, outer wire grounded Frequency range 10 kHz to 1 MHz Transmitting level 0 to -50 dB (-5 Np), full-scale deflection with automatic regulation Mains voltage variation ±10% Temperature range +15 °C to +35 °C		±0.2 dB ±0.02 Np

Outputs

three-pole jack	floating, balanced
coaxial jack 1.6/5.6.....	external wire grounded

Internal impedance .....≈0 Ω

for frequency range 0.2 to 5 kHz, can be switched to... 600 Ω

for the range 2 to 1620 kHz can be switched to.....75,125,135,140,150,600 Ω

Signal-to-distortion ratio a_{k2} or a_{k3}

at 100 kHz and with the relative values 0 Np, 0 dB: Zi=Z=75 Ω .....>54 dB (>6.3 Np)

Spurious emissions .....>60 dB (>7 Np) down

External modulation (AM)..... 0 to 100%

Frequency range .....0 to 20 kHz

Frequency response, as referred to 1 kHz..... ±2%

Envelope distortion ratio for m=100%.....approx.40 dB (approx.4.6 Np)

Required modulation voltage for 1% modulation .....approx. 30 mV

Output voltage for frequency measurements (frequency counter).....1 V

permissible load impedance .....>10 kΩ

Power supply "protective-insulation" grade.....

.....100 to 140 and 200 to 265 V, 47 to 63 Hz, approx. 13 VA at 220 V

LEVEL METER

Basic device D 354

Wideband

Frequency range .....200 Hz to 1620 kHz

Model	
B 302: 0 dB≙0.775 mV 0 dBm≙1 mW	B 602: 0 Np≙0.775mV 0 Npm≙1 mW

Measuring ranges

for zero instrument reading can be switched in steps of 10 dB, 1 Np

with balanced input	-40 to +20 dB	-5 to +2 Np
	-30 to +20 dBm	-4 to +2 Npm

smallest measurable (readable) level	-50 (-60) dB -40 (-50) dBm	-6 (-7) Np -5(-6) Npm
with coaxial input	-60 to +20 dB -50 to +20 dBm	-7 to +2 Np -6 to +2 Npm
smallest measurable (readable) level	-70 (-80) dB -60 (-70) dBm	-8 (-9) Np -7 (-8) Npm

Level error at 100 kHz

with the relative values: range switch 0 dB, 0 Np

zero instrument mark	±0.1 dB	±0.01 Np
attenuator error	±0.1 dB	±0.01 Np
Frequency response of the reading	±0.1 dB	±0.01 Np
Variation of the reading with a mains voltage variation of ±10%	±0.03 dB	±0.003 Np

Typical total level error for Z_i=Z=75 Ω, coaxial, outer wire grounded Frequency range 10 kHz to 1 MHz Level measuring range 0 to -50 dB (-5 Np) full-scale deflection Mains voltage variation ±10% Temperature range +15 °C to +35 °C after calibration	±0.2 dB ±0.02 Np

Impedance of the balanced floating input in the frequency range 1 to 600 kHz .....≧10 kΩ
0.3 to 1000kHz .....≧4 kΩ
0.2 to 1620 kHz.....≧2 kΩ

can be switched to .....75, 125, 135, 140, 150, 600 Ω

Impedance of the coaxial, single-ended input.....10 kΩ ‖ 60 pF
can be switched to .....75, 125, 135, 140, 150, 600 Ω

Dc output
for level scale-spread device or recorder: Z = 2.5 kΩ .....0 to 250 mV

Ac output
frequency range .....as input signal
output level for zero instrument mark: at Z=75Ω .....0 dB (0 Np)
internal impedance ..... 75 Ω

Earphone output .....for audio-frequency modulated input signal

Selective

Basic device D 354
with the slide-in chassis oscillators I
D 369 and II D 370

Frequency range ..... 200 Hz to 1620 kHz

Main setting f_1

with spectrum lock-in in 10 kHz steps.... 0 to 1620 kHz
continuously ..... 0 to 1620 kHz

Fine setting f_2

with spectrum lock-in ..... 0 Hz
continuously .....-3 to +13 kHz
smallest readable frequency increment ..... approx. 20 Hz

Frequency error

f_1 and f_2 with spectrum lock-in ..... $\pm 1 \times 10^{-5}$
f_1 with spectrum lock-in, f_2 continuous ... $\pm 1 \times 10^{-5}$ ± 30 Hz

Frequency change with $\pm 10\%$ mains voltage variation

f_1 and f_2 with spectrum lock-in ..... $\pm 2 \times 10^{-7}$
f_1 with spectrum lock-in, f_2 continuously.. $\pm 2 \times 10^{-7}$ ± 2 Hz

Automatic tuning system

frequency tuning of the level oscillator
from the level meter for ..... f_1 and f_2

frequency tuning of the level meter from
the level oscillator for ..... f_1 and f_2

Automatic frequency sweep

with sweep attachment W 935/G 2022
and slide-in chassis f_1 W 940
for wide sweeps ..... ± 3 to ± 800 kHz

with sweep attachment W 935/G 2022
and slide-in chassis f_2 W 940
for narrow sweeps ..... ± 25 to ± 3000 Hz

mid-frequency, continuously adjustable
from ..... 200 Hz to 1620 kHz

Model

B 302: 0 dB≙0.775 V B 602: 0 Np≙0.775V
0 dBm≙1 mW 0 Npm≙1 mW

Measuring ranges

in the frequency range 2 to 1620 kHz
for zero instrument mark,
can be switched in steps of
10 dB, 1 Np

"Low-distortion" measuring function with balanced input	-100 to +20 dB	-11 to +2Np
	-90 to +20 dBm	-10 to +2Npm
smallest (readable) measurable level	-110 (-120)dB	-12 (-13) Np
	-100 (-110)dBm	-11(-12)Npm
with coaxial input	-120 to +0dB	-13 to +0 Np
	-110 to +10dBm	-12 to +1 Npm
smallest measurable (readable) level	-130(-140)dB	-14(-15)Np
	-120(-130)dBm	-13(-14)Npm
"Low-noise" measuring function with balanced input	-60 to +20 dB	-6 to +2 Np
	-50 to +20 dBm	-5 to +2Npm
smallest measurable(readable) level	-70 (-80) dB	-7 (-8) Np
	-60(-70) dBm	-6 (-7) Npm
with coaxial input	-80 to +20 dB	-8 to +2 Np
	-70 to +20 dBm	-7 to +2 Npm
smallest (readable) measurable level	-90(-100) dB	-9(-10) Np
	-80 (-90) dBm	-8(-9) Npm

Measuring ranges

in the frequency range 200 Hz to
2 kHz
"low-noise" measuring function
for zero instrument mark
can be switched in steps of
10 dB, 1 Np

with balanced input	-60 to +20 dB*	-6 to +2 Np*
	-50 to +20 dBm	-5 to +2Npm
smallest measurable (readable) level	-70(-80)dB	-7(-8) Np
	-60(-70) dBm	-6(-7) Npm

*In the frequency range >800 Hz measurements can also be made in the more sensitive measuring ranges in the "low-distortion" position.

with coaxial input	-80 to +20 dB*	-8 to +2 Np*
	-70 to +20 dBm	-7 to +2 Npm
smallest measurable (readable) level	-90 (-100) dB	-9 (-10) Np
	-80 (-90) dBm	-8 (-9) Npm
Measuring error at 100 kHz, 0 dB, 0 Np and the relative values: range switch 0 dB, 0 Np zero instrument mark	±0.1 dB	±0.01 Np
attenuator error	±0.1 dB	±0.01 Np
in the most sensitive range ...	±0.3 dB	±0.03 Np
Frequency response of the indication in the frequency range 2 to 1620 kHz	±0.2 dB	±0.02 Np
200 Hz to 2 kHz	±0.4 dB	±0.04 Np
Indication changes with ±10% mains voltage variation	±0.03 dB	±0.003 Np
Typical total measuring error for Z_i=Z=75 Ω, coaxial, outer wire grounded Frequency range 10 kHz to 1 MHz Level measuring range 0 to -100 dB (-10 Np) full-scale deflection Mains voltage variation ±10% Temperature range +15 °C to +35 °C after calibration		±0.2 dB ±0.02 Np

Selectivity

can be switched to ..... 3 bandwidths

selectivities available

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*In the frequency range > 800 Hz measurements can also be made in the more sensitive measuring ranges in the "low-distortion" position.

	Narrow band Filter 1 (200 Hz to 1620 kHz)	Medium band Filter 2 (2 to 1620 kHz)	Wideband Filter 3 (10 to 1620 kHz)
Width of pass band $\Delta a \leq 0.5$ dB	$\pm$5 Hz	$\pm$20 Hz	$\pm$800 Hz
Bandwidth $\Delta a = 3$ dB	$\sim$20 Hz	$\sim$80 Hz	$\sim$3.1 kHz
Stop-band attenuation			
a = 30 dB at	$\pm$60 Hz	$\pm$150 Hz	$\pm$4 kHz
a = 60 dB at	$\pm$150 Hz	$\pm$500 Hz	$\pm$10 kHz

Intermediate frequencies

f_{IF1} ..... 2.40 MHz

f_{IF2} ..... 100 kHz

Intermediate frequency rejection for f_{IF1}, f_{IF2} .. $\geq$ 80 dB (9 Np)

Image-frequency rejection

for $f_m + 2f_{IF1}$ ..... $\geq$ 60 dB (7 Np)

for $f_m + 2f_{IF2}$ ..... $\geq$ 80 dB (9 Np)

Residual distortion attenuations a_{k2} and a_{k3}

in "low-distortion" position with increase in sensitivity to 60 dB (7 Np)

in the frequency range 2 to 1620 kHz ..... $\geq$ 80 dB (9 Np)

with increase in sensitivity by 50 dB (6 Np)

in the frequency range 500 Hz to 2 kHz ..... $\geq$ 70 dB (8 Np)

200 Hz to 500 Hz..... $\geq$ 60 dB (7 Np)

Impedance of the inputs

as with wideband measurements ..... see page

IF output e.g. for logarithmic amplifier

level output, at Z=600 Ω.....max. 0 dB (0 Np)

output frequency ..... 100 kHz

intensity range for input level.....approx. 100 dB (11 Np)

max. input level at the input..... 0 dB, dBm, Np, Npm

Ac output

frequency ..... 100 kHz
level output for zero instrument mark,
at Z=75 Ω ..... 0 dB (0 Np)
internal impedance ..... 75 Ω

Dc output

for level scale-spread device or recorder: at Z=2.5 kΩ ..... 0 to 250 mV

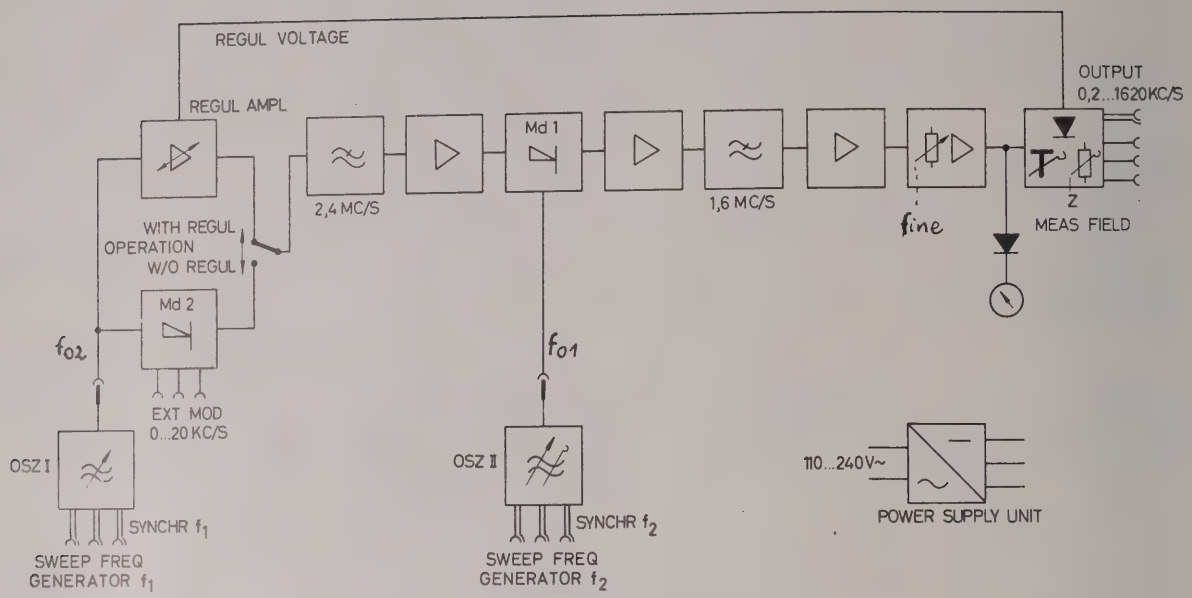
Earphone output .....for audio-frequency modulated input signal

Power supply, "protective-insulation" grade .....100 to 140 and 200 to 265 V, 47 to 63 Hz, approx. 24 VA at 220 V

1.3 Functioning

1.3.1 Level Oscillator

The level oscillator is designed as a beat-frequency oscillator so that the whole frequency range can be covered without band switching. This, along with the unmistakable nature of the scale designations, leads to speedy and continuous measurements. By means of a frequency-spectrum circuit in the variable oscillator I it is possible, if desired, to set the free-running oscillator exactly to a multiple of the fundamental frequency of a crystal oscillator, whereby only a coarse manual setting is necessary, whilst the remaining frequency difference is automatically balanced out by a regulating circuit. In this way it is possible to obtain a crystal-accurate frequency every 10 kHz. Oscillator II provides for interpolating between two spectrum component frequencies: it derives its frequency from the same crystal as oscillator I and in addition from a free-running interpolation oscillator whose frequency, however, is two orders of magnitude lower than that of oscillator II and therefore, as referred to its output frequency, is similarly constant as is the crystal frequency.



level oscillator

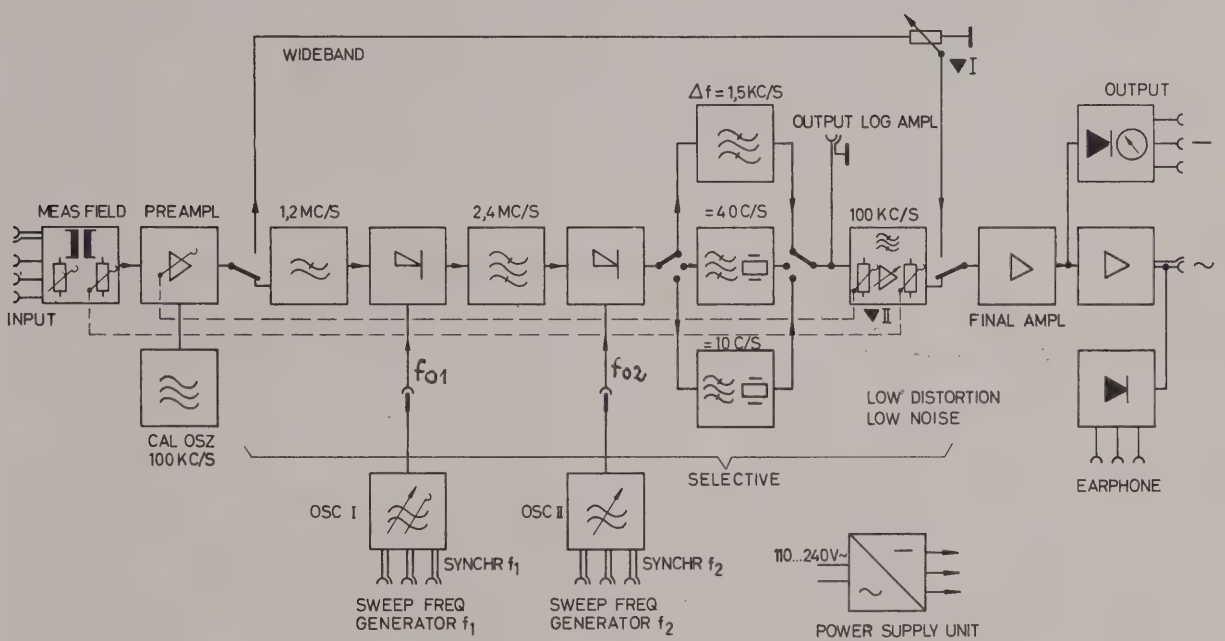
As the variable oscillator frequencies f_{01} and f_{02}' in the level oscillator and level meter are the same, the level meter can be controlled from the transmitting oscillators or the level oscillator from the level-meter oscillators.

A built-in electronic regulating circuit keeps the transmiting level highly constant. The output level can be set between +10 and -75 dB (+1 and -7.5 Np) in 10 dB (1 Np) steps and finely.

The 13 octave wide frequency band is subdivided in the measuring field into an audio range from 0.2 to 5 kHz and a carrier-frequency range from 2 to 1600 kHz. In the audio range the internal impedances ~0 Ω and 600 Ω can be selected; in the carrier-frequency range ~0, 75, 125, 134, 140, 150 and 600 Ω.

1.3.2 Level Meter

The level meter operates according to the superheterodyne principle with double frequency conversion. With selective measurements the frequency range extends from 200 Hz to 1620 kHz. For selective measurements in voice channels from 200 Hz on and pilot level measurements in the total frequency range up to 1620 kHz a particularly narrow filter is provided. Wideband measurements in the range from 200 Hz to 1620 kHz are possible when the heterodyne section is disconnected.



level meter

For wideband measurements the output amplifier follows the preamplifier. The measuring range for zero instrument mark extends from -60 to +20 dB (-7 to +2 Np). The highest sensitivity is given by thermal noise and the bandwidth of the input circuit.

To obtain even higher sensitivity, as is necessary for example in measuring crosstalk and stop-band attenuation of filters, the measuring bandwidth must be reduced. For this purpose a

heterodyne unit with double frequency conversion is interposed between preamplifier and output amplifier for selective measurements. The selectivity is determined by three optionally connectable filters of differing bandwidths.

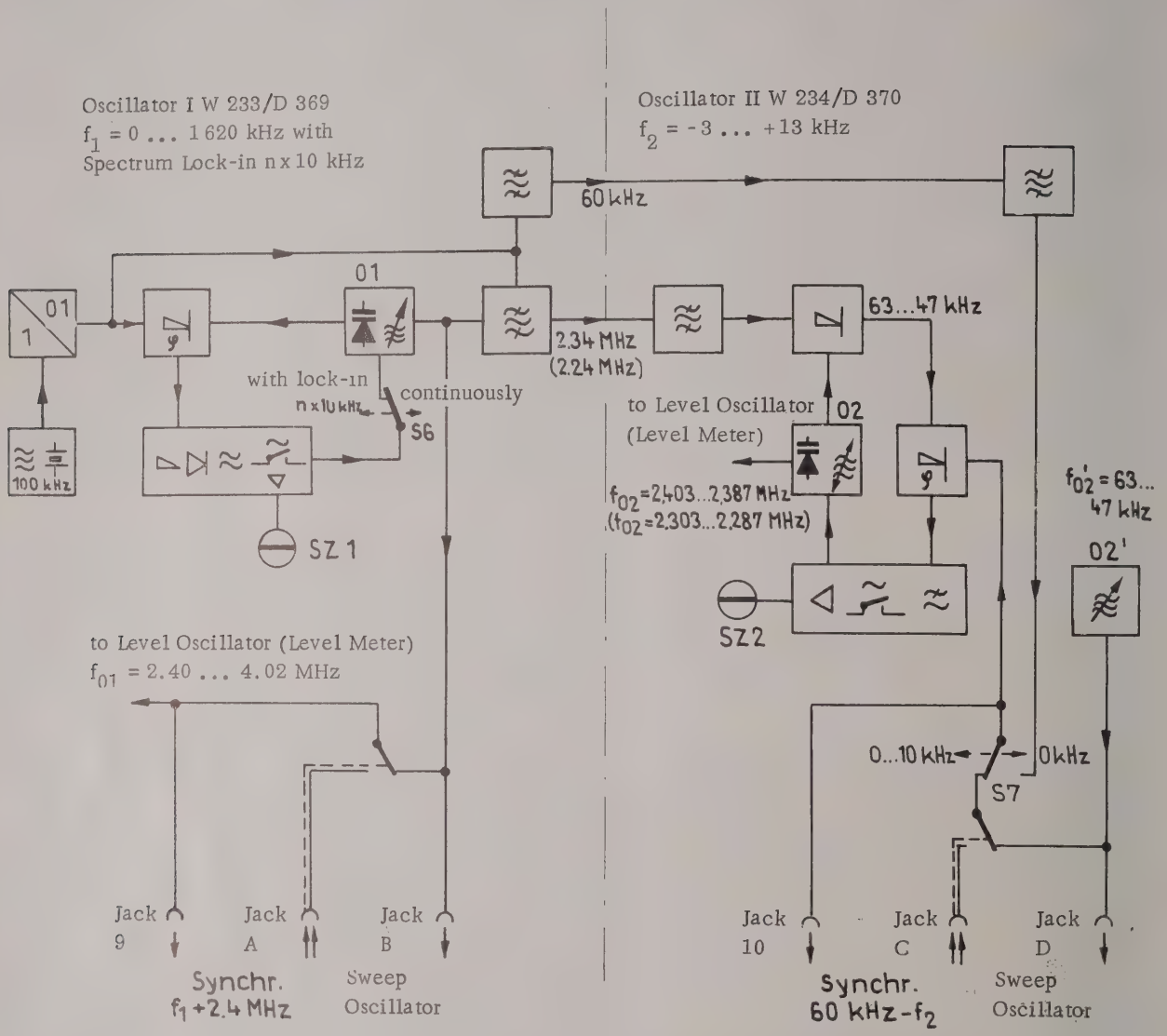
The level meter has a relatively wide filter (1.6 kHz Hz flat, 3.1 kHz between 3 dB points) for surveying and swept measurements, a filter with a bandwidth 40 Hz for point by point measurements and extremely low levels (10 Hz) for pilot level measurements. According to the measurements in hand, the "low--noise" and "low-distortion" operating options are provided to procude the greatest signal-to-noise ratio or the lowest residual distortion. With selective measurements the nominal deflection appears on the instrument when the input level is as low as -120 dB (-13 Np).

High frequency accuracy is achieved by means of a lock-in oscillator I and a finely tunable interpolation oscillator II. The oscillators have a common fundamental crystal and are extremely similar to the ones in the level oscillator.

The level meter has a balanced floating input and a coaxial single-ended grounded input. In addition either a high impedance input or an input terminated into the characteristic impedance of the specimen can be chosen by means of a transfer switch. The terminating impedance itself is adjustable to the usual values between 75 and 600 Ω. The actual input level can be considered by means of the level switch. Further the reading can be switched to voltage level or power level. Attenuation differences which arise with the switching from balanced to coaxial input and from the "low-distortion" to the "low-noise" mode and also with the transfer from voltage level to power level, are automatically taken into account - the actual values being illuminated on the level switch - so that reading errors can be avoided.

In addition to the instrument indication there is a dc output for the connection of a graphic recorder or a scale-spreading device (PEGELLUPE). As a result of the high stability of the level meter measurements in terms of tenths of a percent can so easily be carried out. An ac output produces a level of 0 dB across 75 Ω for zero instrument mark. At the earphone output an audio-frequency modulated input signal can be monitored. Finally there is another output with a particularly high intensity range. Connected with the level tracer Type D 346 and the logarithmic amplifier slide-in chassis Type D 920 of the tracer the attenuation characteristic of a filter, for example, can be represented within a level range of 100 dB.

1.3.3 Oscillators I and II for Level Oscillator and Level Meter



The frequency data given in brackets refer to the oscillators of the level meter

1.3.3.1 Oscillator I (spectrum oscillator) W 233 for the Level Oscillator W 231 and D 369 for the Level Meter D 354

Oscillator I (spectrum oscillator) produces the control voltage for the main modulators in the level oscillator and the level meter. It sweeps the frequency range f_{01} = 2.40 to 4.02 MHz. When operating with spectrum lock-in, switch S6 in

"spectrum lock-in position n x 10 kHz", the output frequency of the oscillator can be set to all values n x 10 kHz with crystal accuracy. For this purpose it contains a 10-kHz crystal spectrum which is derived from a crystal-controlled 100-kHz oscillator. This 10-kHz spectrum is compared with the frequency of the oscillator 01 in a frequency regulating circuit.

A lock-in indicator (Sz 1) shows whether the frequency of 01 lies on or near a spectrum point. After disconnecting the frequency spectrum generator with switch S6, oscillator I can be also operated with continuous frequency control.

1.3.3.2 Oscillator II (Interpolator) W 234 for Level Oscillator W 231 and D 370 for Level Meter D 354

Oscillator II (interpolator) generates the signal voltage (f_{02} = 2.403 to 2.387 MHz) for the main modulator of the level oscillator, and the drive voltage (f_{02} = 2.303 to 2.287 MHz) for the second modulator of the level meter, respectively. It is continuously tunable in a range of 16 kHz so that every frequency between two spectrum points can be "interpolated" with an overlap. The frequency (f_{02}) of oscillator 02 is controlled by the interpolation oscillator 02' ($f_{02'}$ = 63 to 47 kHz). By means of a frequency regulating circuit the resultant frequency is the sum of the frequencies of the interpolation oscillator ($f_{02'}$) and the spectrum frequencies 2.34 MHz (level oscillator) and 2.24 MHz (level meter) respectively.

The interpolation frequency is nearly two orders of magnitude below that of the spectrum frequency used so that its absolute error corresponds approximately to that of the crystal-accurate spectrum frequency. Therefore the voltage produced by oscillator II has approximately the frequency accuracy of a crystal.

If desired, oscillator II can be set with crystal accuracy to the output frequency f_{02} = 2.40 MHz (2.30 MHz). To do so the interpolation oscillator is switched off at switch S7 and the 60-kHz frequency derived from the 10-kHz spectrum used as

control frequency for oscillator 02.

Oscillator II only operates in the "locked" position. This is shown on the main visual indicator, i.e. Sz 2 shows green.

1.3.3.3 Automatic Tuning

With selective operation of the level meter, automatic tuning for f_1 and f_2 permits single-knob frequency tuning. As a result either the level oscillator or level meter can be selected as the controlling device according to the measuring problem in hand.

Automatic Tuning for f_1

For this, jack Bu 9 of the controlling device and jack Bu A of the controlled device must be interconnected. Then oscillator 01 delivers via jack Bu 9 the sync line and jack Bu A the control level for the main modulator of the controlled device. At the same time the spectrum oscillator of the controlled device is disconnected via the jack-operated contact with respect to RF.

Automatic Tuning for f_2

The automatic tuning system for f_2 operates similarly to that for f_1. As the output frequencies of the oscillators 02 in the level oscillator (2.403 to 2.387 MHz) and level meter (2.303 to 2.287 MHz) differ by 100 kHz, the second intermediate frequency of the level meter, synchronization is here effected in the frequency position of the oscillator 02' ($f_{02'}$ = 63 to 47 kHz).

When the jack Bu 10 of the controlling device is connected to the jack Bu C of the controlled device the oscillator 02' is switched off.

The level received by jack Bu C now controls the frequency regulating circuit. The output frequency f_{02} of the controlled oscillator II is now offset by exactly 100 kHz from that of the controlling oscillator II.

1.3.3.4 Sweeping

By means of an electronic sweep device it is possible to sweep the level measuring setup within ±25 Hz to ±800 kHz. In this operation the measuring frequency changes in the form of a triangular function. The frequency sweep range, the mid-frequency and the sweep rate can be set according to the measuring problem in hand. The sweep equipment consists of a sweep attachment W 935/G 2022 ans various sweep oscillator slide-in chassis for adaptation to various level measuring setups. Two slide-in chassis are provided for the 1.6-MHz level measuring setup W 231/D 354:

sweep oscillator I W 940 for sweeping the oscillators I W 233/D 369 within a range of

± 3 to ±800 kHz and

sweep oscillator II W 941 for sweeping the oscillators II W 234/D 370 within a range of

± 25 Hz to ± 3 kHz.

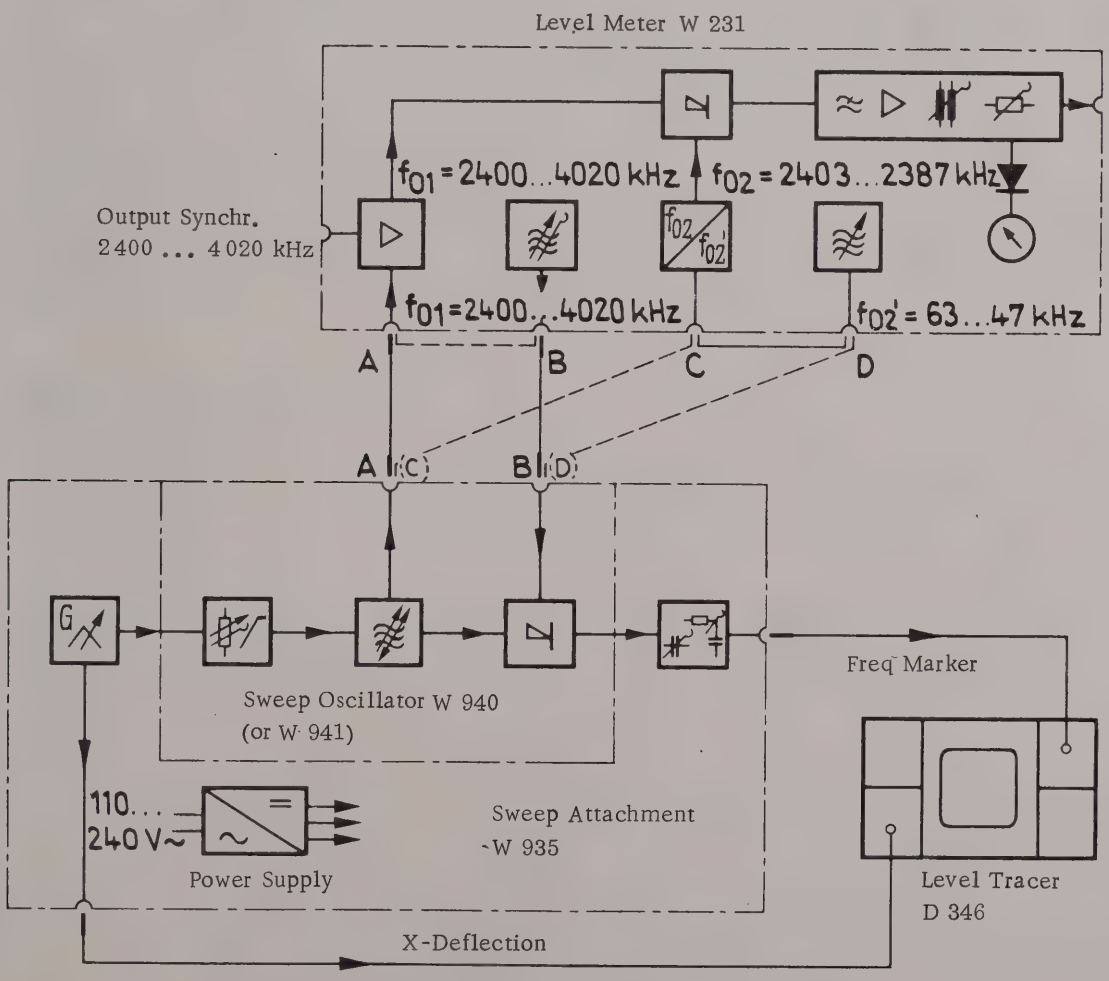


Fig. 3 Carrier-Frequency Sweep Measuring Setup
Functional Circuit Diagram

Fig. 3 shows the sweeping of the level oscillator. For wide sweeps of ±3 to ±800 kHz the sweep oscillator I W 940 delivers its output voltage at the jack Bu A of the level oscillator and thereby controls the main modulator of the oscillator. For RF, the level-oscillator spectrum-oscillator is separated from its basic device by the switching contact at jack Bu A, but still delivers its RF voltage via the jack Bu B into the sweep oscillator to produce a frequency marker for the level tracer.

For small sweeps of ±25 Hz to ±3 kHz the sweep functions in a similar way as for wide sweeps. The sweep attachment now contains the sweep oscillator W 941 which is connected to the level oscillator via the sockets Bu C and Bu D.

The frequencies and levels at the sweep terminals A,B,C and D of oscillators I and II of the level oscillator and level meter correspond. Therefore the level meter can be swept with the same sweep oscillators. A level meter extended in this way is said to be a panoramic receiver which, on the level tracer, shows the actual signal coverage on the swept frequency range.

Further information on the operation of the sweep measuring setup is contained in the description M 706.

1.4 Accessories, Dimensions and Weights

Description	Type	Dimensions in mm	Approx. Weight in kg
Level oscillator W 231 200 Hz to 1620 kHz			
-75 to +10 dB/dBm	S45034-W231-B302	556x326x307	14.3
-7.5 to +1 Np/Npm	S45034-W231-B602	556x326x307	14.3
Accessories:			
2 coaxial connection cords	V42251-C113-A102	1000	0.3
Necessary for operation:			
Oscillator I W 233 0 to 1620 kHz	S45034-W233-A702	-	3
Oscillator II W 234 -3 to +13 kHz	S45034-W234-A702	-	3
Level meter D 354 200 Hz to 1620 kHz			
-130 to +20 dB/dBm	S45034-D354-B302	556x326x307	16
-14 to +2 Np/Npm	S45034-D354-B602	556x326x307	16
Necessary for operation:			
Oscillator I D 369 0 to 1620 kHz	S45034-D369-A702	-	3
Oscillator II D 370 -3 to +13 kHz	S45034-D370-A702	-	3
Accessories on request			
Connecting cords, balanced	Rel ltg 546a to d	500 to 2000	0.2
balanced	Rel ltg 703d to h	1000 to 3000	0.2
coaxial 1.6/5,6; Z=75Ω	V42251-C100-A117	1000	0.3
Sweep attachment W 935,or G 2022 resp.	see data bulletin M 706	556x258x307	10
Level tracer D 346	see data bulletin M 706	556x394x517	35

Fig.1 Level oscillator W 231 with oscillators W 233 and W 234

Level meter D 354 with oscillators D 369 and D 370

2.1 Preparation

The devices leave the factory for connection to a supply voltage of 200 V ac to 265 V ac, shown at the voltage selector S8 by "200 V". For other supply voltages between 100 V ac and 140 V ac the voltage adjuster S8, contained in the power supply jack, must be set in position "110 V".

If the device is to be used on 110 V, the 0.315-A fuse in the power supply assembly of the level meter should be changed for a 0.63-A fuse. This fuse is in the spares bag fastened to the chassis.

The power socket is on the back panel of the device. The connection to the mains is made via the power cord supplied.

The devices are, in accordance with the protective grounding safety regulations of the VDE (Association of German Electrical Engineers), insulated against excessive touch potentials.

2.2 Assembling the Measuring Setup

The measuring setup is preferably assembled as in Fig. 1.

2.3 Calibrating and Setting

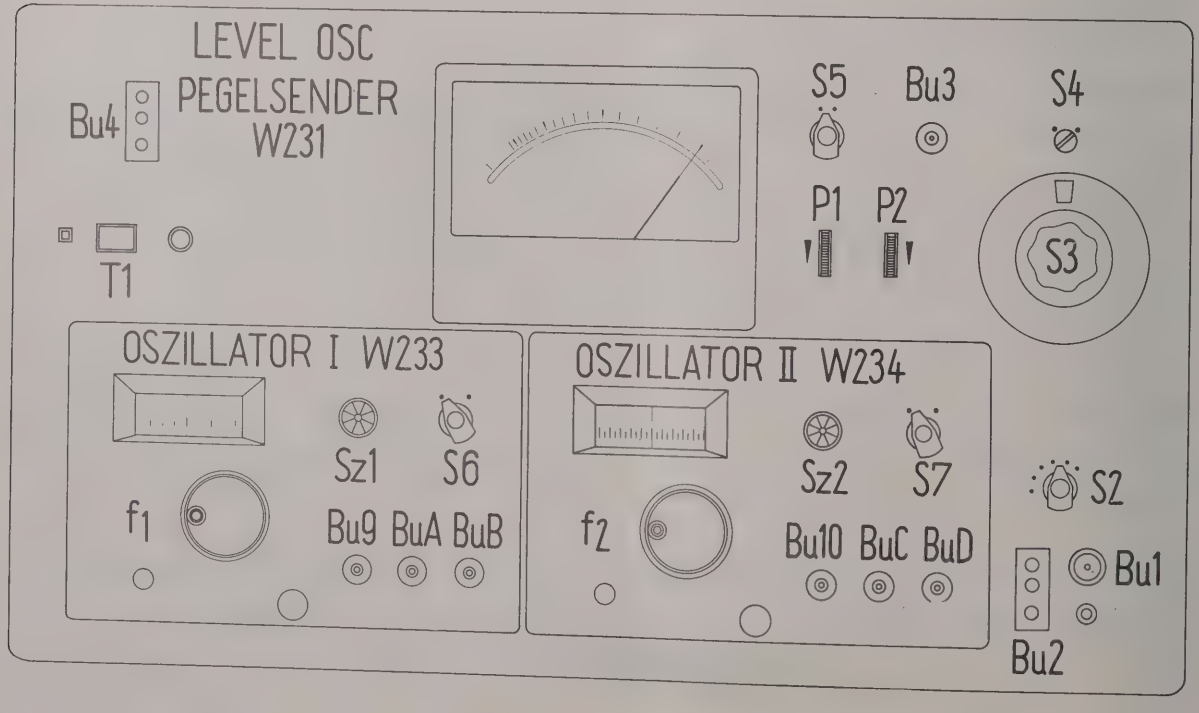
2.3.1 Level Oscillator

Connect the level oscillator to the ac mains and energize it with the power switch T1. The indicating lamp SL1 near T1 lights up for a check. The device is ready for operation immediately.

2.3.1.1 Setting the Frequency

The transmitting frequency is the sum of the settings of f_1 and f_2 of oscillators I and II.

At switch S6 of oscillator I the choice is made between "tuning, locked in spectrum steps n x 10 kHz" (when high frequency stability and accuracy are required) and continuous (for general measurements). At switch S7 of oscillator II the choice is made between continuous control "0 to 10 kHz" and the crystal-accurate spectrum lock-in point "0 kHz".



Then the following adjustments are possible:

S6: with spectrum lock-in n x 10 kHz, S7: 0 to 10 kHz

f_1-adjustment to the spectrum lock-in point directly below the transmitting frequency and then adjust f_2 for the total locking amount.

S6: with spectrum lock-in n x 10 kHz, S7: 0 kHz
gives crystal-accurate transmitting frequencies n x 10 kHz in the range 10 to 1620 kHz.

S6: continuous, S7: 0 kHz
With f_1 any frequency in the range 0.2 to 1620 kHz can be set. The variety of settings possible is important for general measurements, i.e. to find the pass band or attenuation poles of unknown specimens. For exact measurements proceed subsequently according to 1.1.

S6: continuous, S7: 0 to 10 kHz
Possible settings as in 1.3 but additional fine setting with f_2 is possible.

Visual indicators Sz1 and Sz2 show the operation condition of the oscillators as follows:

Oscillator I		Oscillator II*	
Setting f_1	Sz1	Setting f_2	Sz2
with spectrum lock-in n x 10 kHz on a spectrum point	green	0 to 10 kHz	green
with spectrum lock-in n x 10 kHz between two spectrum points	red	0 kHz (crystal accurate)	green
continuous	green		

*Note: When the devices are turned on or S7 transfers Sz2 attracts for approx. 0.4 s, i.e. shows red.

2.3.1.2 Setting the Internal Impedance

The internal impedance of the level oscillator is set to the Z-value of the specimen by the Z-switch S2. When doing this take note of the range limits of the audio (0.2 to 5 kHz) and carrier-frequency (2 to 1600 kHz) measuring fields.

For various measuring connections, a low-impedance source is advantageous: setting Z ~0 Ω. Take note that setting Z ~ 0 Ω in the carrier-frequency range is loaded with Z ≧ 75 Ω and in the audio range with Z ≧ 600 Ω.

2.3.1.3 Voltage or Power Level

The calibration of the level oscillator can be switched from voltage level (0 dB/Np corresp. to V_o = 0.775 V) to power level (0 dBm/Npm corresp. to P_o = 1 mW/across Z) by means of Switch S4.

2.3.1.4 Setting the Transmitting Level

With S3 the transmitting level can be set in 10-dB (1-Np) steps and with the fine control P1 the intermediate values can be set by reference to the instrument. In the automatic level control mode (S5: ON), "Level Fine" control P2 affords an additional control of the output level over a vernier range of approx. ±0.5 dB/±0.05 Np.

2.3.1.5 Level Regulation

The built-in level control can be disconnected at switch S5: necessary for measurements with amplitude modulation. For all other measurements set S5 on "On".

2.3.1.6 Modulation

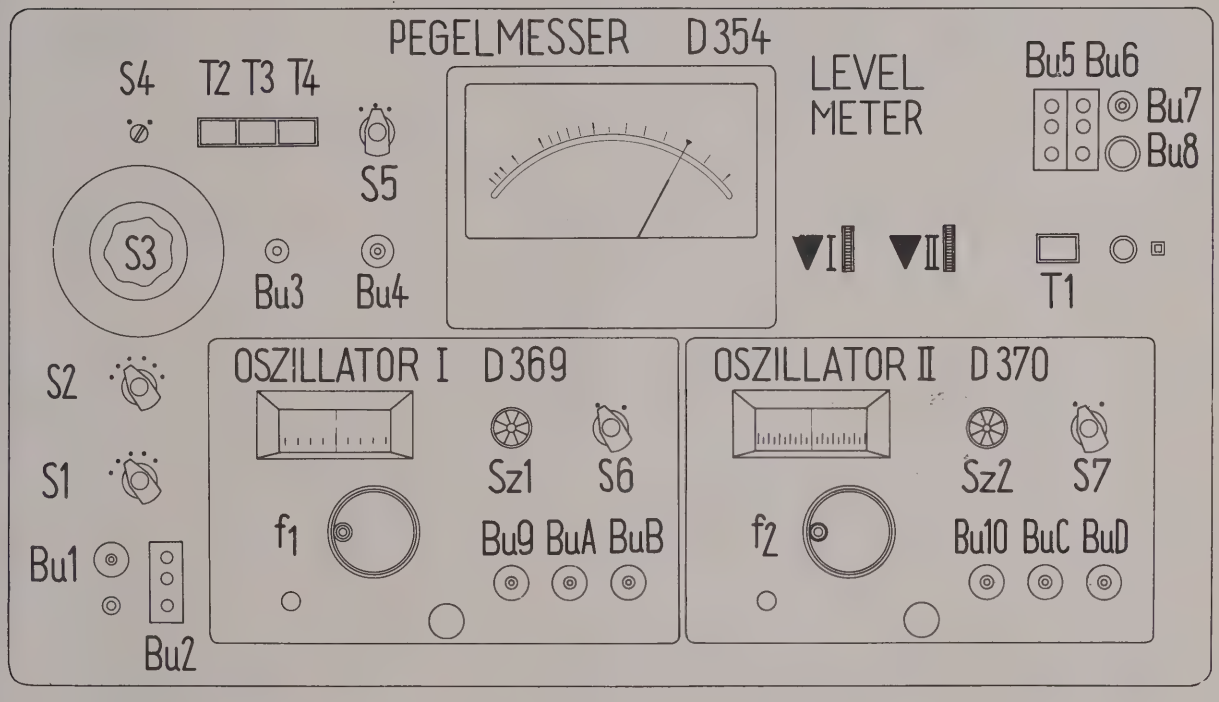
By applying an ac voltage having a frequency of up to 20 kHz to jack 4 the output signal can be amplitude modulated. For this S5 should be in position "Off". A modulating voltage of approximately 3 V rms is required for 100% modulation. The input impedance of the external modulation device is about 5 kΩ.

2.3.1.7 Connection of a Frequency Counter

Jack 3 is provided for the connection of a frequency counter. With a load of ≧ 10 kΩ and zero instrument indication there is an output voltage of approx. 1 V rms at jack 3.

2.3.1.8 Expansion to the Sweep Measuring Setup

For the required details refer to the Full Information on the attachments.



2.3.2 Level Meter

Connect the level meter to the ac mains and energize it with the power button T1. For verification the indicating lamp SL1 near T1 lights up. The device is immediately ready for operation.

2.3.2.1 Level Calibration

The settings for wideband and selective calibration are independent of each other, without any interaction. Before calibration the mechanical zero of the instrument ($-\infty$ on the scale) should be checked with the device energized.

Calibration "▼I" for Wideband Measurements

S3: left stop in position "▼"

T2: depressed

Then adjust the instrument pointer with the knurled knob "▼I" (near the instrument) to the red calibrating mark.

Calibration "▼II" for Selective Measurements

During the calibrating procedure no plugs must be in the jacks A and C.

S3: left stop in position "▼"
S5: choose desired pass band width, see 2.3.2.4.
S6: with spectrum lock-in n x 10 kHz
f_1: with spectrum lock-in 100 kHz
S7: "▼II, 0 to 10 kHz"
T3 or T4: depress

With the frequency control f_2 maximize the meter reading (calibration 100 kHz), then adjust the knurled knob "▼II" for deflection to the red calibrating mark.

2.3.2.2 Input Impedance of the Level Meter and Termination of the Specimen

By means of switches S1 and S2 the input impedance of the level meter can be selected and matched to the Z-value of the specimen. With S1 either the coaxial input jack 1 or the balanced input jack 2 is selected. In the positions "Z" of S1 the inputs are terminated into the values set at the Z-switch S2. In a further position of the switch S1 the input impedance of the level meter is 10 kΩ ‖ 60 pF with coaxial input and > 10 kΩ with balanced input (see electrical values, page 5).

These positions are used for measurements on specimens or systems which are already terminated into their characteristic impedances.

2.3.2.3 Voltage or Power Level

The calibration of the level meter can be switched from voltage level (0 dB/Np corresp. to V_o = 0.775 V) to power level (0 dBm/Npm corresp. to P_o = 1 mW/across Z) by means of switch S4.

2.3.2.4 Choice of Pass Band Width

For adaptation to various measuring problems three band widths can be selected by means of switch S5.

Bandwidth 1600 Hz (3-dB-down bandwidth ~ 3.1 kHz) for general and sweep measurements in the frequency range 10 to 1620 kHz;

Bandwidth 40 Hz (3-dB-down bandwidth ~ 80 Hz) for exact measurements and for suppression of interfering voltages when utilizing full sensitivity with sweeping in the frequency range 2 to 1620 kHz;

Bandwidth 10 Hz (3-dB-down bandwidth 20 Hz) for separating frequencies lying very close together, e.g. pilot level measurements and for measurements in the VF channels.

Frequency range 200 Hz to 1620 kHz.

2.3.2.5 Signal-to-Noise Ratio (T3: low-distortion, T4: low-noise)

Special applications, such as the presentation of curves on the screen of a level tracer or the increasing of the relative measuring accuracy by means of a scale-spread attachment B 977 require a signal-to-noise ratio as large as possible. It is at its largest when key T4 "low-noise" is depressed. This position should be used for all customary measurements. Depress key T3 "low-distortion" only when the sensitivity is to be further increased (a lamp no longer lights up in the "Koramat" unit) or when measuring distortion. In the low distortion mode, a pass band width of 40 Hz, or for the audio range 10 Hz, should be selected.

2.4 Measuring

2.4.1 Wideband Level Measurements

Level oscillator: set as in 2.3

Level meter: after setting the switches S1 and S2 to the required input impedance and the line system (coaxial or balanced) and S4 to the calibration for voltage level (dB,Np) and power level (dBm,Npm), respectively, connect the specimen to the input via a shielded line. Depress T2 "wideband". Set

the range switch S3 to a range in which the pointer of the instrument is well up-scale, if possible. The unknown level is found by adding the value shown in the illuminated window of the level range switch ("Koramat") and the instrument reading. If no lamp of the level range switch lights up any longer, the measuring range for wideband measurements has been exceeded.

2.4.2 Selective Measurements (without automatic tuning)

Level oscillator: setting as in 2.3.

Level meter: settings S1, S2, S3, and S4 as for wideband measurements. Depress key T4 or T3, respectively, when maximum sensitivity is required (see 2.3.2.5).

First set S6 to continuous, S7 to 0 kHz and S5 to bandwidth 1600 Hz (note 2.3.2.4). Slowly turn f_1 through the related frequency range until a deflection appears. Tune frequency for maximum deflection. Set sensitivity with S3 so that the pointer of the instrument is well up-scale.

Level reading as with wideband measurements:

Sum of the values shown on the range switch and the instrument. If the measuring frequency is to be accurately determined set S6 to "with spectrum lock-in n x 10 kHz", S7 to "0 to 10 kHz" and S5 to 40 Hz or 10 Hz. Set the f_1 tuning control to the spectrum point lying directly under the measuring frequency so that Sz1 shows green. Then tune f_2 for maximum instrument indication. The frequency of the unknown voltage then equals the sum of the settings $f_1 + f_2$.

2.4.3 Distortion Attenuation Measurements

In the "selective" range the level meter is also suited for measuring low distortion factors down to 0.1‰ (60 dB or 7 Np distortion attenuation). If the sensitivity is increased by 60 dB (7 Np) the residual distortion attenuation of the level meter is $\geq$ 80 dB (9 Np) and is independent of the fundamental level at the preamplifier and main modulator. Depress key T3

"low-distortion" for measuring distortion attenuation. Select pass band width 40 Hz or, for frequencies below 2 kHz, 10 Hz. For determining the distortion attenuation the fundamental level (f_m) must first be measured. Then the instrument is tuned to the respective harmonics $2 \times f_m$, $3 \times f_m$ etc. with a corresponding increase in sensitivity by means of switch S3. The difference, in logarithmic measure, between the fundamental level and the harmonic level is the distortion attenuation a_{kn} for the respective (n-th) harmonic.

When measuring the harmonic level it should be noted that the sensitivity must not be increased by more than 60 dB (7 Np) with S3 as compared with the setting for measuring the fundamental level. As long as an increase of the sensitivity with S3 brings about a correspondingly greater deflection on the instrument it is certain that the harmonic shown is really due to the measuring voltage and the instrument is operating in its linear range.

From the distortion attenuation a_{kn} the distortion factor k_n for the n-th harmonic can be calculated as a percentage as follows:

$$k_n = 100 \times 10^{\frac{-a_{kn}}{20}} \qquad \text{in \% for } a_k \text{ in decibel}$$

$$k_n = 10 - e^{-a_{kn}} \qquad \text{in \% for } a_k \text{ in neper}$$

For distortion attenuations of $a_{kn} > 20$ dB the distortion factor of the measuring level is calculated as follows:

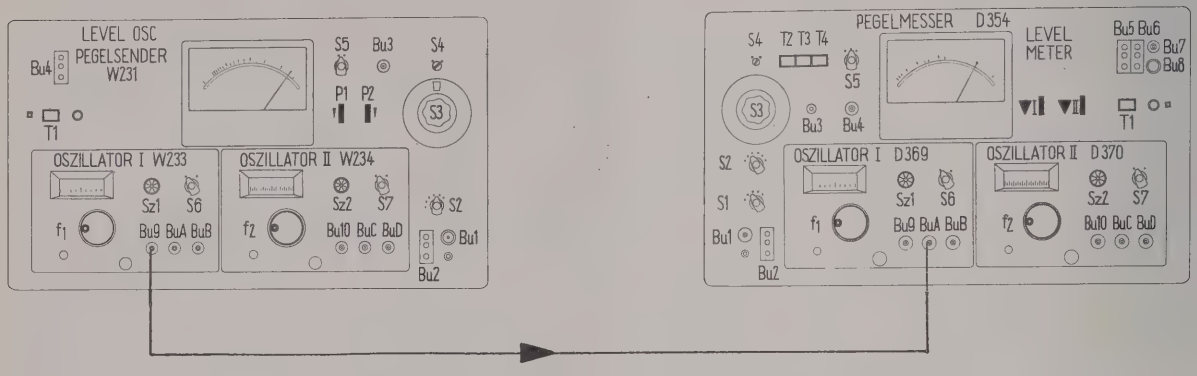
$$k = \sqrt{k_2^2 + k_3^2 + \ldots k_n^2} \qquad \text{in \%}$$

2.4.4 Measurements with Automatic Tuning

Select the bandwidth with S5 according to the measurement problem. If difficulties should arise with the 10-Hz filter in circuit, note point 3.4 in the Maintenance Instructions.

Setting the Frequency on the Level Oscillator

Automatic Tuning for f_1

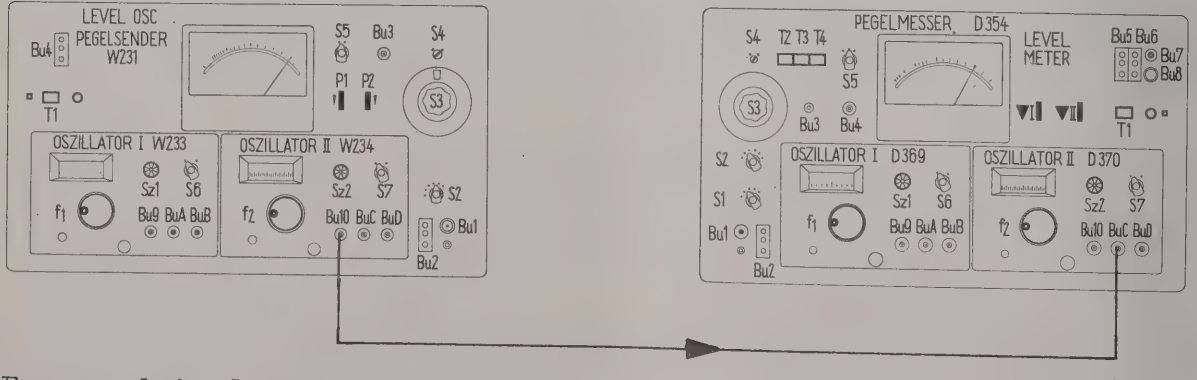


Before beginning measurements set the pointer to a maximum with f_2.

For f_2 = 0 kHz set S7 at the level oscillator and level meter to 0 kHz.

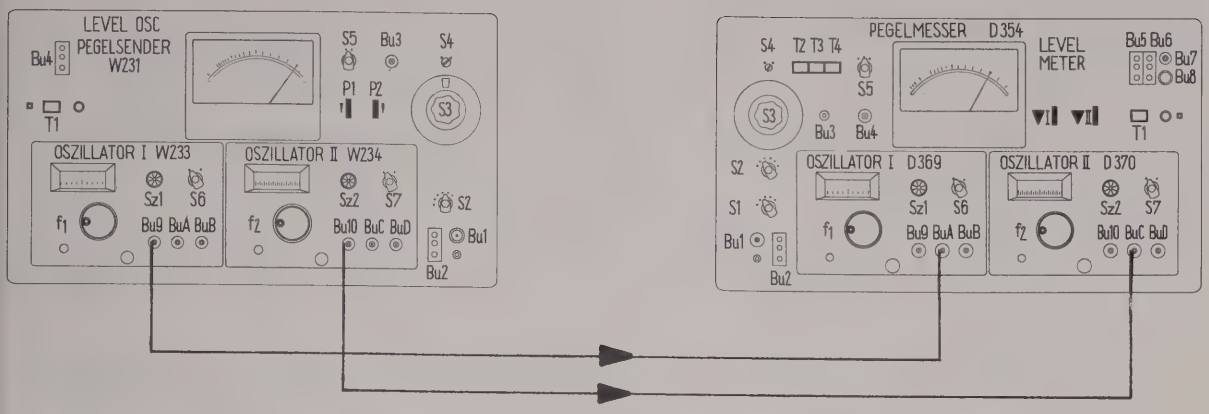
Set the frequency at the level oscillator with f_1 only.

Automatic Tuning for f_2



For quadripole measurements set f_1 at the level oscillator and level meter to the same frequency and thereby switch S6 to "with spectrum lock-in n x 10 kHz". Set switch S7 at oscillator II of the level meter to position "0 to 10 kHz".

Automatic Tuning for f_1 and f_2



Settings at the level oscillator:

Frequency settings f_1 and f_2

S6: either "with spectrum lock-in n x 10 kHz" or "continuous"

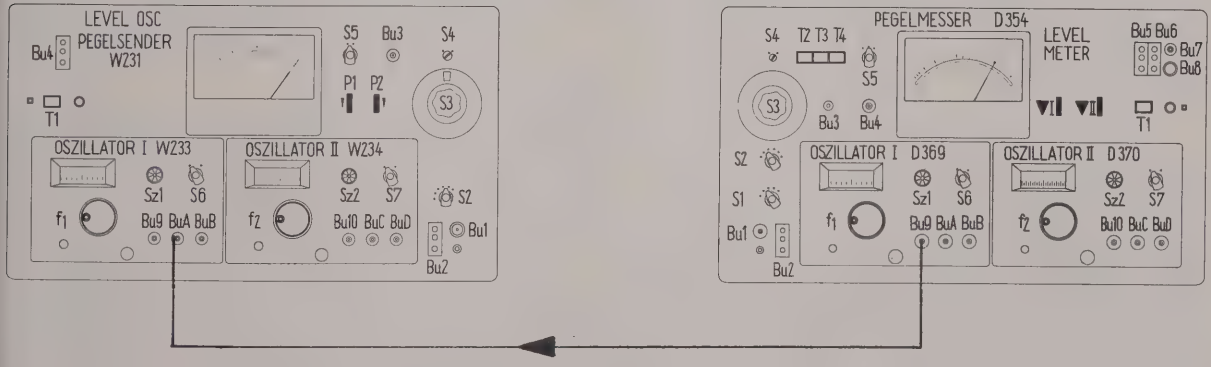
S7: either "0 to 10 kHz" or "0 kHz"

Settings at the level meter:

S7: "0 to 10 kHz"

Frequency Settings at the Level Meter

Automatic Tuning for f_1

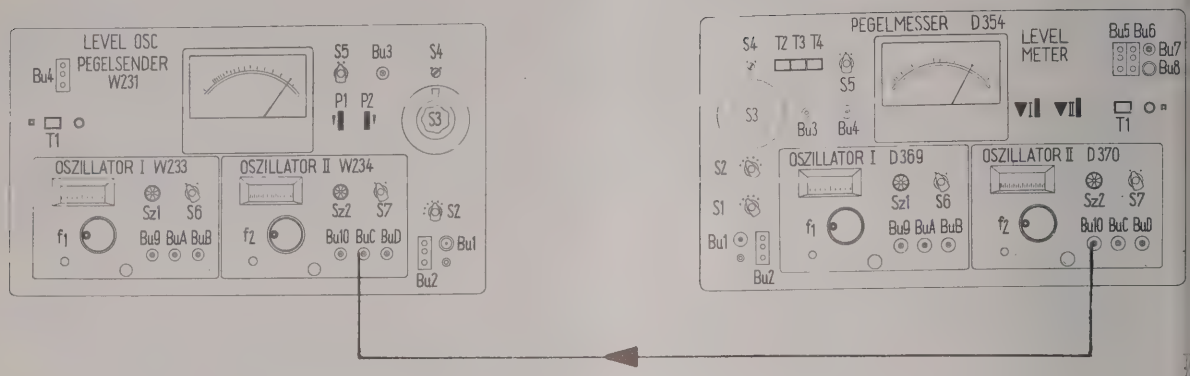


Before beginning measurements adjust f_2 for maximum pointer deflection.

For f_2 = 0 kHz set S7 at the level oscillator and level meter to "0 kHz".

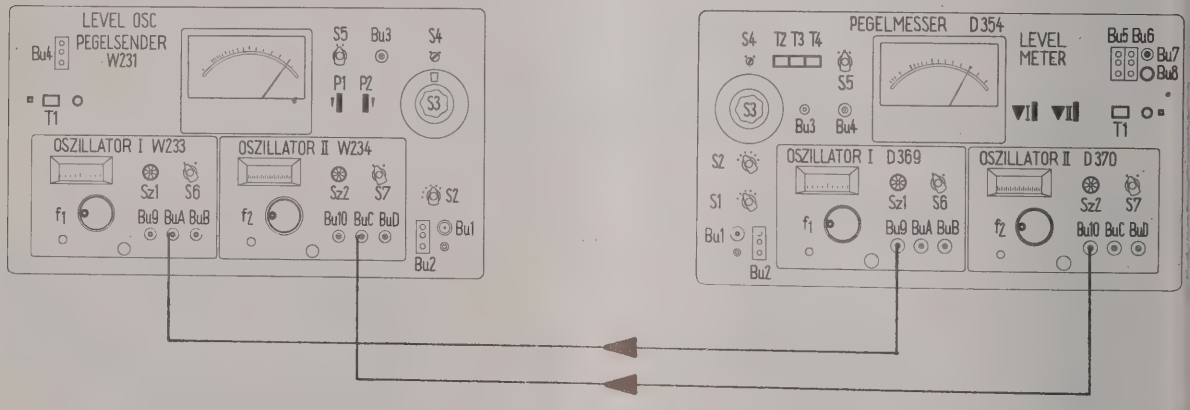
Set the frequency at the level meter with f_1 only.

Automatic Tuning for f_2



For quadripole measurements set f_1 at the level oscillator and level meter to the same frequency and thereby switch S6 to "with spectrum lock-in n x 10 kHz". Set switch S7 at oscillator II of the level oscillator to position "0 to 10 kHz".

Automatic Tuning for f_1 and f_2



Settings at the level meter:

Frequency settings f_1 and f_2

S6: either "with spectrum lock-in n x 10 kHz" or "continuous"

S7: either "0 to 10 kHz" or "0 kHz"

Settings at the level oscillator:

S7: "0 to 10 kHz"

2.4.5 Automatic Tuning with Other Carrier-frequency Measuring Devices in the Frequency Range up to 1.6 MHz

Automatic Tuning from the Digital Level Oscillator G 2001/G2004

The digital level oscillators G 2001 and G 2004 produce a synchronizing voltage at the jack "Bu 1 f_1 + 2.4 MHz" with which oscillators I of the level oscillator or level meter can be controlled. Oscillators II must be set to "0 kHz" by means of switch S7.

Automatic Tuning in the Case of the 1.6-MHz Measuring Setup W 221/D 344

The tuning condition for f_1 of the level oscillator W 221 or level meter D 344 can be controlled by oscillator I of the level oscillator or level meter (jack 9). In level oscillator W 221 jack Bu A is the input jack for the sync voltage, in the level meter the jack "Sync.f_1 + 2.4 MHz".

2.4.6 Using the Level Meter as a Detector Amplifier

The level meter can be used as a wideband or selective detector amplifier. All settings on the level meter are effected as for wideband or selective measurements. At jack Bu 7 with termination into Z = 75 Ω and zero instrument indication there is an output level of 0 dB/Np. With wideband operation the frequencies of the input and output voltage are equal, with selective operation the second intermediate frequency f_{IF2} = 100 kHz is produced.

2.5 Accessories

2.5.1 Voltage Recorder 3 V/30 kΩ (100 µA for full-scale deflection)

Connect the voltage recorder to the jack Bu 6 "Output" between the a- and c-wires. Insert a dummy plug in the b-wire (to operate a switching contact on the jack).

2.5.2 Current Recorder 77.5 /µA/2.5 kΩ

Connect the recorder to jack Bu 6 "Output" between the a- and b-wires. Wire c is connected to chassis.

UNIREG S is, for example, a suitable recorder, with a terminating resistance R = 2.5 kΩ.

2.5.3 Connection of Scale-spread Device B 977

Connect the scale-spread device B 977 via a balanced cord to jack Bu 6. While the level meter reads -8 to +2 dB/ -0.9 to +0.2 Np adjust the deflection of the scale-spread device also to 0 dB/Np with the zero point control. Level increments between ±0.02 and ±1 dB (±0.002 and ±0.1 Np) can then be read. To improve the signal-to-noise ratio with selective measurements depress key T4 "low-noise".

2.5.4 Headphone Output, Jack Bu 5

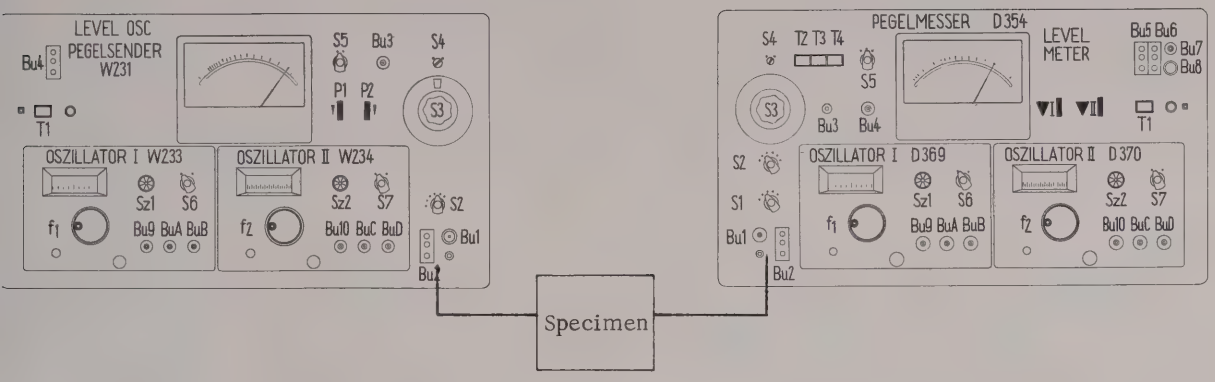
When measuring an amplitude-modulated input voltage there is a demodulated VF signal at jack Bu 5.

2.5.5 Connection of Level Tracer D 346

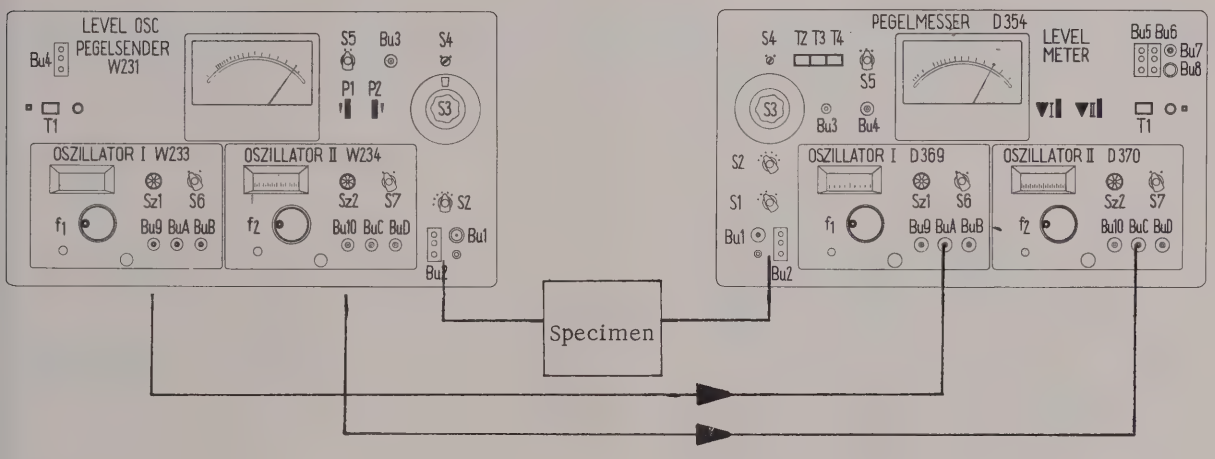
For measurements with level differences up to about 10 dB the wideband amplifier slide-in chassis D 918 of the level tracer is connected via a coaxial cord to jack Bu 7 of the level meter. Level meter and level tracer can be calibrated together so that absolute measurements are also possible.

To display level differences of up to 100 dB/11 Np, the logarithmic amplifier D 920 is connected to the ac output Bu4 (IF = 100 kHz). S3 must be set to the positions marked with a red spot.

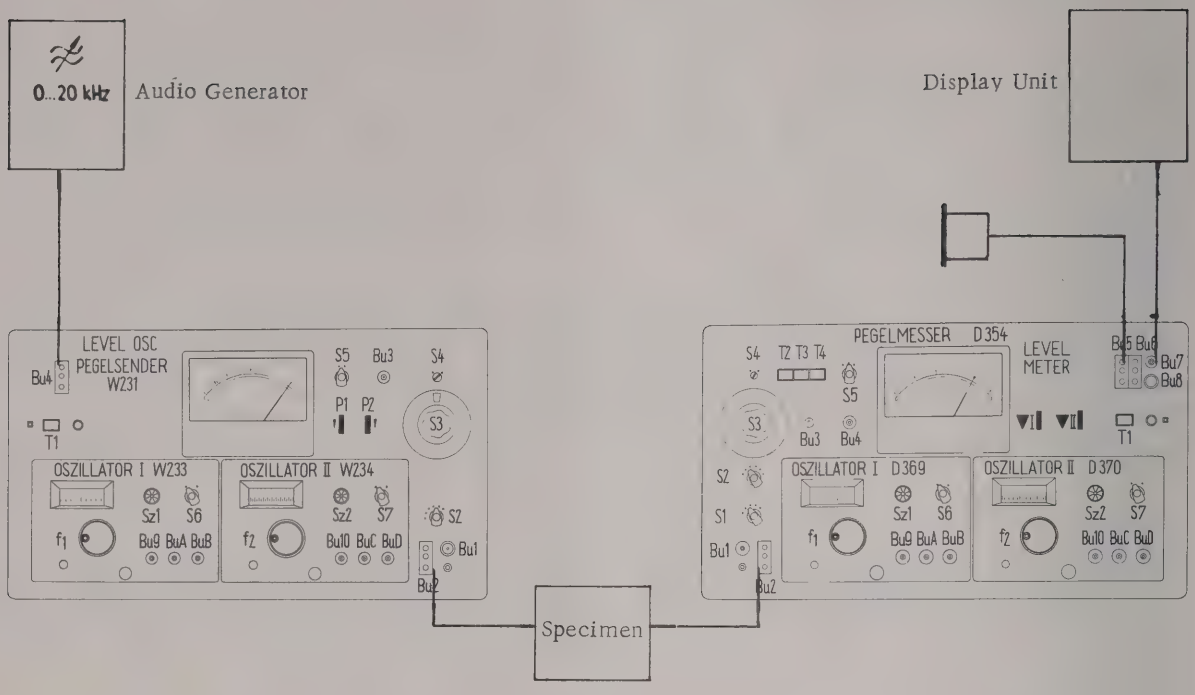
2.6 Typical Measuring Setups



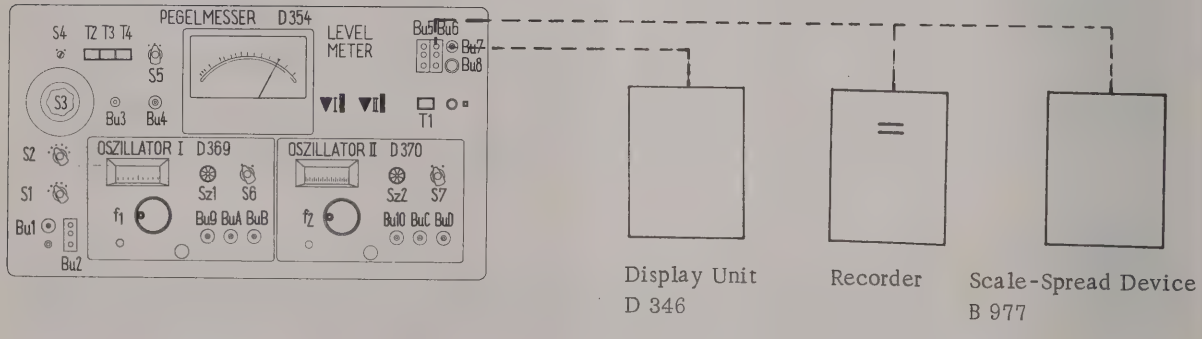
2.6.1 Wideband and Selective Level, Attenuation and Gain Measurements



2.6.2 Selective Level, Attenuation and Gain Measurements with Automatic Tuning f_1 and f_2 from the Level Oscillator



2.6.3 Measurements with Amplitude-modulated Transmitting Level and Monitoring with Headphone and Display Unit



2.6.4 Connection of Accessory Devices to the Level Meter (level tracer, recorder and scale-spread device)

3. NOTES ON MAINTENANCE

The devices contain components of high reliability and long useful life. Silicon transistors are used as active elements. As a result regular maintenance and scheduled supervision are not necessary.

3.1 Switches

The switches used are self-cleaning and require no special maintenance. Contact surfaces should never be treated with fat or grease-dissolving agents.

3.2 Replacing Indicating Lamps

for power and measuring-range indication

The indicating lamps have bayonet sockets: they can be removed by pushing in slightly, combined with a slight twist to the left. Use the lamp extractor contained in the spares bag (secured inside the device). All indicating lamps are accessible from the outside.

For replacing lamps in switch S3 unscrew the dial knob and the grey cover plate. When replacing these parts the left red ▼ sign, at the left stop of S3 and S4, must be above the right transparent window.

FILM DRIVE, REPLACING THE SCALE FILM

The film drive is of rugged construction and requires no maintenance. The film tape which carries the scale divisions, individually applied by a photographic process, consists of particularly strong and permanent plastic special foil (Dupont Cronar Film No. 225 B 35) for the purpose of ensuring greatest accuracy in setting the frequency. Under normal conditions therefore, trouble need not be anticipated. Should a fault nevertheless occur, take down the film cassette with care, following the instructions given below and detect the fault. Never attempt to move the drive by using force. Should the film have been damaged, then insert the spare film by following these instructions. We recommend that the piece of negative film supplied with the equipment is forwarded to our works for making a new spare film after the removal of the spare film.

If the transport band (Fig. 4) has been torn, order a replacement under the order description of "Transport Band C44106-A7-C109 with 2 clips C44106-A7-C110". When placing the band in position, make sure that the lettering on the inner surface of the band is legible; insert the two clips into the overlapping perforations

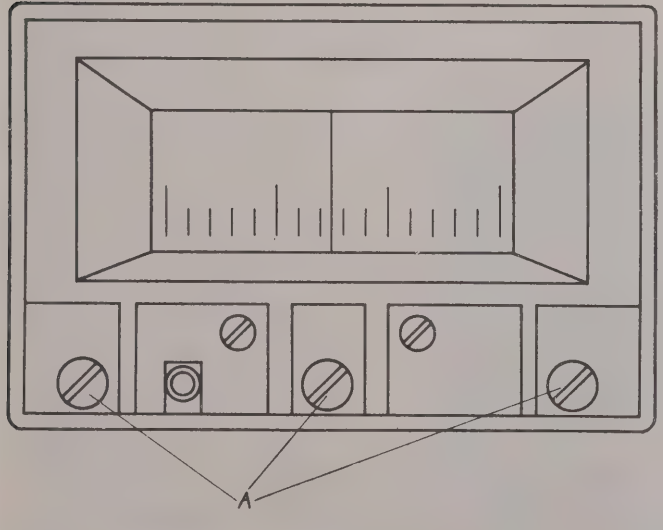


Fig. 1 Film guide

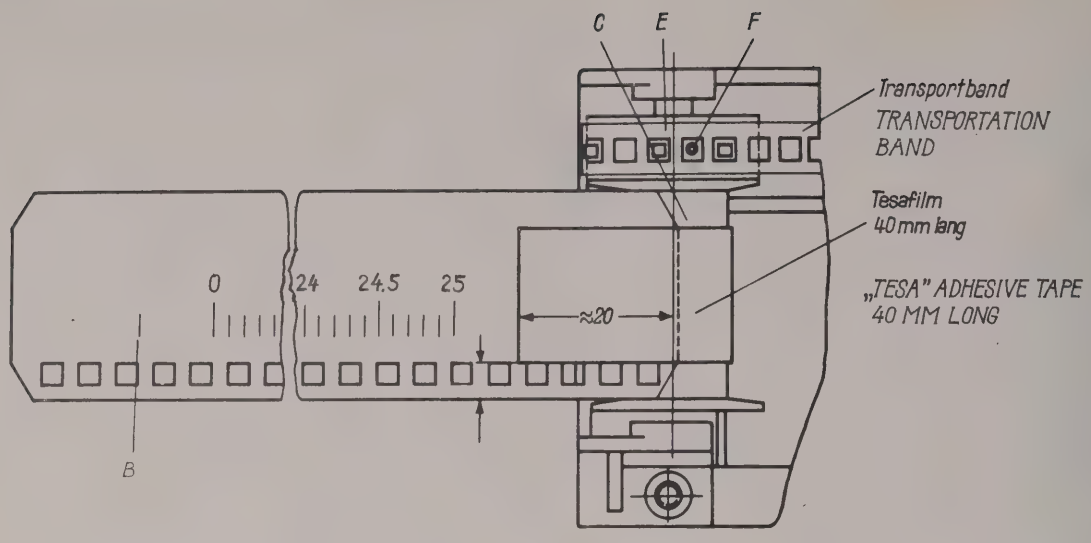


Bild 2 Ankleben des Filmband-Endes
FIG.2 CEMENTING THE END OF THE FILM BAND IN POSITION

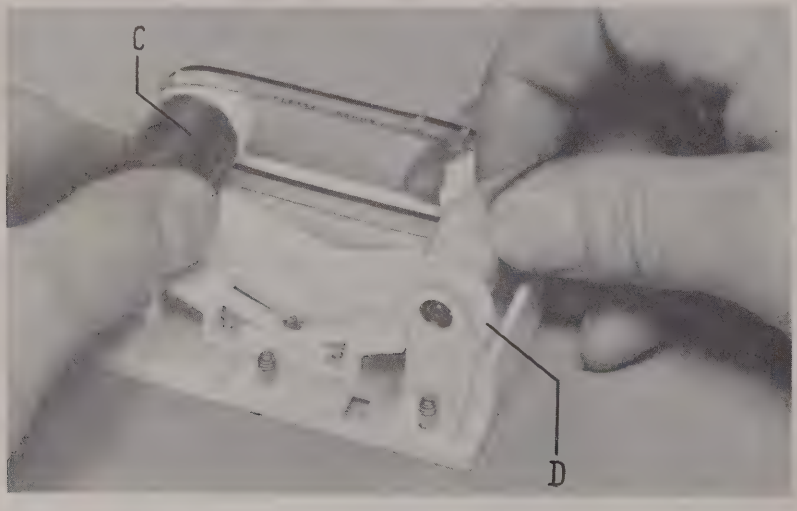


Bild 3 Ankleben des Filmband-Anfangs
FIG.3 CEMENTING THE START OF THE FILM BAND IN POSITION

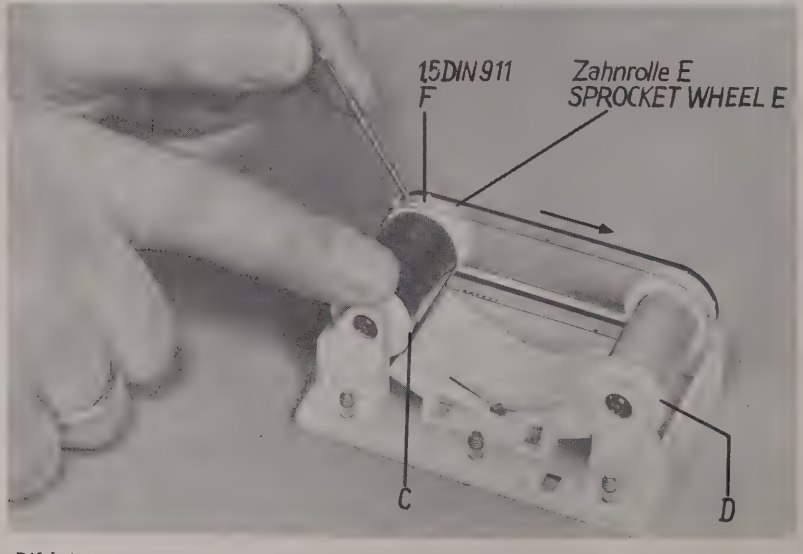


Bild 4 Lösen der Vorspannungs-Arretierung
FIG.4 RELEASING THE DETENT OF THE MECHANICAL BIAS

from inside and bend over. As the initial tension of the film rollers is lost when replacing the transport band, the film must also be inserted again in accordance with the instructions.

Taking Down the Film

1. Either the film cassette is accessible from the front of the unit or the unscrewing of only a partial front name plate or front name plate is required.
2. Turn film drive, if possible, as far as the left-hand stop (beginning of scale), failing this, roll the film by hand on to the left-hand roller after taking down the film cassette. (point 4).
3. Slacken fixing screws (A) of the film guide and pull out the film guide towards the front (Fig. 1).
4. Wind film completely on to roller C and detach adhesive strip from roller D (Fig. 3).
5. Unwind film from roller C and detach adhesive strip from roller C.Carefully remove any residue of adhesive from the rollers.

Inserting the New Film

The spare film must be rolled in such a manner that the lettering for the high frequencies is legible from the outside. Remove dust particles from the film guide with a soft brush, the proceed as follows:

6. Grasp roller C, turn sprocket roller E four turns counter-clockwise (the equalizing spring in roller C is tensioned during the process) and lock in this position by tightening the set screw F with an hexagon socket spanner 1.5 DIN 911, Fig. 4.
7. Stick adhesive strip (40 mm x 19 mm), e.g. "Tesafilm" adhesive strip, order No. 5859, Messrs. Beiersdorf, Hamburg, on to the legible end of the film in such a manner that 20 mm are left projecting (Fig. 2).

8. Stick end of film on to roller C (Fig. 2). The edge of the film must be parallel with the edge of the roller after glueing.

9. Roll film tightly on to roller C (Fig. 3) and grip until point 11 has been carried out.

10. Slip end of film (beginning of scale) only as far through the bearing support and stiffening piece until it can be taughtly glued on to the roller D.

11. Stick film on to roller D as described under points 7 and 8 (Fig. 3).

12. Slacken set screw F (Fig. 4). Spring tension must now be felt. If roller C is gripped and sprocket roller E given a quarter turn anticlockwise, the sprocket roller must return to its initial position when being released.

13. Turn one of the sprocket rollers until the first unlettered scale mark coincides exactly with the graduation mark in the scale window. (This mark designates the mechanical stop of the film drive).

14. The film drive must be at the left-hand end stop.

15. Insert film guide carefully without exerting pressure and note whether the film perforations drop into the sprocket.

16. Uniformly tighten the three fixing screws (A) of the film guide.

17. Verify for a second time that the film has been inserted correctly by checking the frequency calibration.

4. FAULT LOCATION

4.1 FAULT LOCATION ON THE DEENERGIZED DEVICE

4.1.1. As a first step check the measuring setup. Examine all connecting and interconnecting cords for a firm seat of their connectors and satisfactory condition (for instance transition resistance for wires and shield).

4.1.2. Check whether possibly an operating error has been committed on one of the equipment units associated with the measuring setup.

4.1.3. Make a visual examination.

4.2. FAULT LOCATION ON THE ENERGIZED DEVICE

Caution: When connecting the exposed chassis to the mains, observe the safety regulations (for instance in Germany those of the VDE (Association of German Electrical Engineers) for rooms with electrical equipment)). Entrust such work to skilled personnel only.

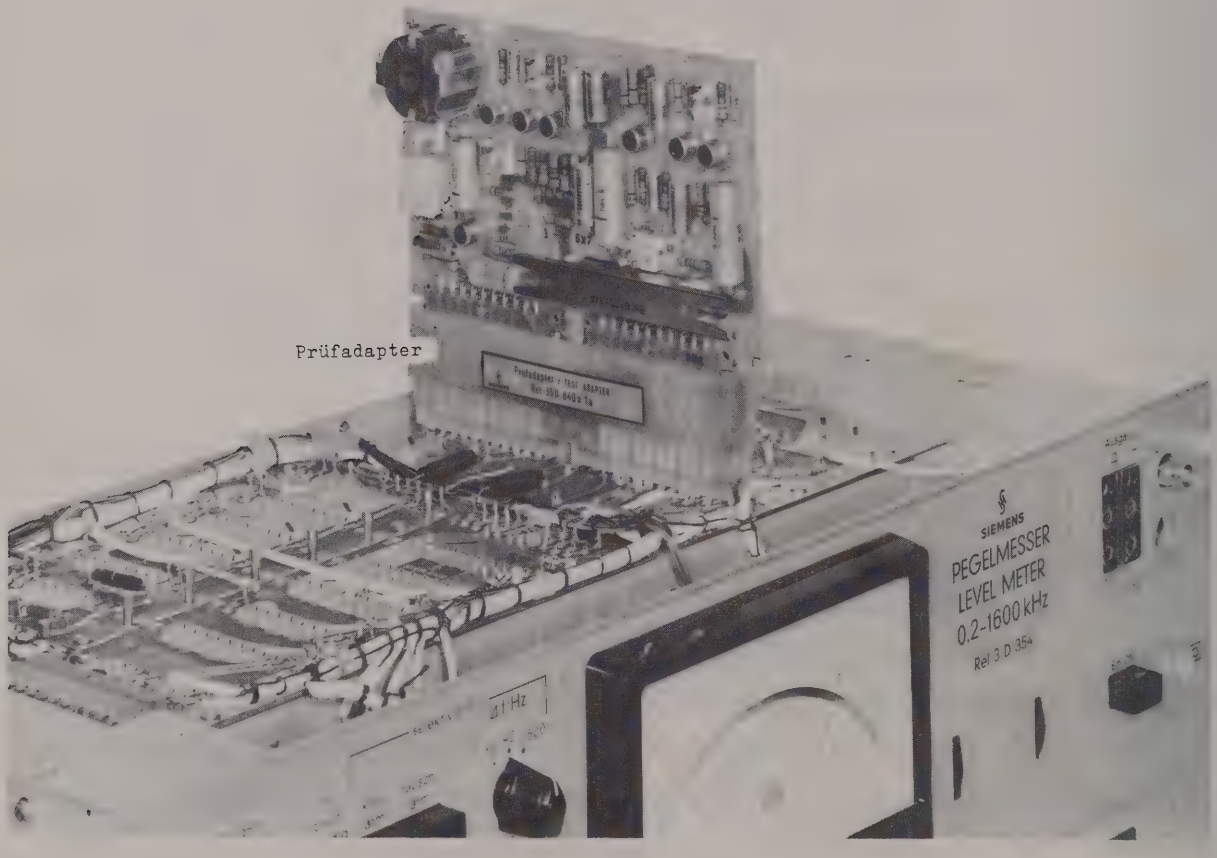
4.2.1. General Information

The main information for fault locating includes the circuit diagrams with entered measured values in the Circuit Diagrams part and the 'Fault Elimination' part, as well as the test plan (annexed Figs. 1 and 2). If the actually observed kind of fault is mentioned in the following fault location table, a course of action according to the information given there often considerably reduces the fault location time. Observations made by the user may be entered at the end of these tables. We would appreciate very much to receive such supplements and are gladly prepared to duplicate them for the benefit of others.
All dc and ac voltage values specified in the circuit diagrams are averages taken from measurements with the measuring instruments enumerated on pp. 4-6 of the Fault Elimination. Unless specific tolerances are stated, the error of the indicated measured values is about ± 15%.

Finding out the subassemblies, individual components and measuring points is facilitated by the wiring diagrams, marked by "7402" in the last four data positions, e.g. wiring diagram for the

level meter S45034-D354-B602-*-7402.

All plug-in circuit boards in the 'level oscillator' and 'level meter' mainframes and in the oscillator plug-ins can be operated outside the chassis by way of the test adapter D640 contained in the mainframe. For this purpose the circuit board is taken out of the holder and placed onto the test adapter screwed onto the interconnecting conductor board. This greatly facilitates fault locating in a circuit board since good access to the individual components and foil patterns is attained.



Typical application of the test adapter D 640 (Prüfadapter = Test adapter)

The test points marked on the interconnecting adapter boards also greatly facilitate the locating of a defective subassembly. If a detected fault cannot be remedied by the user himself, it will mostly suffice to return the defective circuit board to the factory.

4.2.3. FAULT LOCATION TABLE FOR LEVEL METER D354 WITH OSCILLATOR I D369 AND OSCILLATOR II D370

Type of Fault	Fault Location
"▼I", "▼II" and measuring wideband (T2 pushed) and selective (T3 or T4 pushed) are not possible	According to annexed Fig. 1
Measuring selective (T3 or T4 pushed) and "▼II" are not possible	According to annexed Fig. 2
"▼I" and "▼II" are not possible, but an externally applied test level is correctly indicated	Check the circuit board 'calibrating oscillator D641'; the calibrating voltage -40 dB (-5 Np) can be measured at jack Bu3 with a level meter of high impedance
The measuring range switch S3 fails to switch the level steps properly in wideband measuring (T2 pushed)	Look for the fault in the measuring panel D630 according to the circuit diagram; in so doing check the resistive input dividers and the feedback preamplifier D636
The measuring range switch S3 fails to switch properly the level steps in selective measuring and in the 'low-noise' measuring mode (T3 pushed)	Look for the fault in the input divider of the input subassembly D631 (A- and B-relays) and on the voltage dividers in the 100-kHz amplifier D647
The measuring range switch S3 fails to switch properly the level steps in selective measuring and in the 'low-noise' measuring mode (T4 pushed), while in wideband and selective 'low-distortion' measurements range switching is in order	Relays A and B in the measuring field must have dropped out, relay K in the 100-kHz preamplifier D647 must have operated

Type of Fault	Fault Location
No output level is present at measuring output jack Bu7 with full-scale deflection of the instrument	Check board 9 'power amplifier and demodulator D649'
Indication depends strongly on the mains voltage	Check board 10 'power supply II'
In f_1-synchronization of the level oscillator from the level meter there is no indication on level oscillator and level meter	Measure the voltage at jack Bu9 with RF Multizet meter, nominal value: 0.27 V across 75 Ω
In f_2-synchronization of the level oscillator from the level meter there is no indication on the level meter	Set the frequency tuning control f_1 on level meter and level oscillator to the same lock-in point. Measure the voltage at jack Bu10 with the RF Multizet meter, nominal value: 0.78 V across 600 Ω. Move switch S7 on the level oscillator to the position "0-10 kHz". Select a pass-band width of 40 Hz or 1600 Hz with switch S5 on the level meter. If a pass-band width of 10 Hz is required (frequency range 200 Hz - 2 kHz), observe p. 32, Section 3.4. of the Notes on Maintenance.
The frequency departure of the f_2-scale exceeds 30 Hz	Set the following on the level meter: S3 0dB (dBm, Np, Npm), T4 pushed, S5 10 Hz, f_1 0kHz, S6 'in spectrum steps', f_2 0 kHz, S7 0-10 kHz. Alignment by means of C2 for maximum meter deflection.

5. FAULT ELIMINATION

5.1. GENERAL INFORMATION

The basis of the fault elimination work is the circuit diagrams, wiring diagrams and parts lists. Particular care must be exercised in replacing defective parts on etched circuitry. If no soldering iron with suction facility is available for unsoldering a component, the respective component had better be cut out of the circuit and subsequently unsolder the remaining terminal wires individually. In this way damage of the foil pattern can be avoided. When soldering temperature-sensitive components such as semiconductors, Styroflex capacitors and small carbon-film resistors in the circuit, protect them with flat pliers from thermal destruction.

In addition to individual information the following sections give instructions for aligning and the checks to be carried out in the individual subassembly after repairs.

5.2. TESTING INSTRUCTION AND FAULT ELIMINATION ON THE LEVEL METER D354 WITH OSCILLATOR I D369 AND OSCILLATOR II D370

This instruction describes all essential checks for examining the electrical data and gives the respective information for fault elimination. To remedy a recognized fault, only those sections need to be observed to which reference is made in the FAULT LOCATION part.

Measuring Instruments Required

1 frequency counter for up to 4 MHz, error $\pm$ 1 $\times 10^{-6}$

1 dc multi-range meter Zi = 50 kΩ/V
e.g. Siemens /uA-Multizet meter

1 digital voltmeter

1 calibrating level meter for checking the 0-dB (dBm, Np, Npm) marks

1 attenuator, e.g. D120

1 variable low-pass filter

1 level oscillator 200 Hz - 1.6 MHz, e.g. W231

1 level oscillator W518 or W2006

1 level scale-spread device B 977

1 variable power supply for setting the primary input voltage

5.2.1. CHECKS ON THE OSCILLATOR I D369

5.2.1.1. Checking the Frequency Scale

Required settings: push the button T3 or T4
switch S6 "continuous"
all other control elements arbitrary.

Connect the frequency counter by way of a coaxial connecting cord to jack Bu 9. The measuring frequency shall be equal to the sum of the frequency f_1 set on the film drive plus 2.4 MHz. If the need arises, make a correction at f_1 = 1.6 MHz (corresponds to 4 MHz on the frequency counter) by means of trimmer C1.

5.2.1.2. Checking the Output Level at the Jacks Bu 9 and Bu B

Required settings: push the button T3 or T4
switch S6 "continuous"
all other control elements arbitrary.

Terminate the RF Multizet meter into 75Ω and measure the output voltage at the jacks Bu 9 and Bu B in the frequency range f_1 = 0-1.6 MHz.
Nominal value: 0.27 V ± 10 %

5.2.1.3. Checking the Carrier Voltage for the Main Modulator on the Clip-contact Strip e1,2-e3,4 (⊥)

Required settings: push the button T3 or T4
switch S6 "continuous"
the positions of all other control elements are arbitrary.

Connect the RF Multizet meter to the clip-contact strip e1,2-e3,4 (⊥) and measure the carrier voltage in the frequency range f_1 = 0-1.6 MHz.
Nominal value: 0.27 V ± 10%

5.2.1.4. Checking the Synchronization Input Jack Bu A

Required settings: switch S3 at " "
push the button T3 or T4
switch S5 at 1600 Hz
f_1 = 100 kHz
f_2 = 0 kHz
switch S6 at "in spectrum steps"
switch S7 "0 kHz"

The level meter must now read the calibrating level. Using the calibration control "▼II" set nominal deflection on the instrument. When a coaxial cable is connected to jack A the meter reading must drop to -∞.
When feeding a level of - 9 dB (-1 Np, 0 dBm/75Ω) with the frequency f = 2.5 MHz into the jack A the level meter D354 must again read the previously set level. If such is not the case, check the contact spring sets at jack A.

5.2.1.5. Checking the Holding and the Pull-in Range

Required settings: push the button T3 or T4
switch S6 at "in spectrum steps"
the positions of all other controls are arbitrary.

The visual indicator Sz1 for lock-in indication must show "green" (no current) when the frequency control f_1 is set to a lock-in point n×10 kHz. If the film drive stands between two lock-in points, the visual indicator Sz1 must show "red" (current flows).

The holding range is that range where during slow rotation of the film drive to the left and right from a lock-in point, the visual indicator remains off, showing "green". Within this range the output frequency is always adjusted to this lock-in point. The holding range shall be about ± 1.8 kHz.

The pull-in range is that range within whose limits the AFC circuit 'pulls-in' the frequency, e.g. the visual indicator Sz1 restores to show "green". The pull-in range shall be about ± 1.2 kHz symmetrically about the lock-in point. If the need arises, align R 13 in the spectrum oscillator board 2 W 668 in a way that, with the frequency control f_1 between two lock-in points (Sz1 red), a dc voltage of 5.6 V is measured at the collector of transistor Ts5.

5.2.1.6. Accuracy of the 100-kHz Crystal

Required settings: button T3 or T4 pushed
switch S6 at "in spectrum steps"
f_1 = 4 MHz
the positions of all other control elements are arbitrary.

The output frequency can be measured with a frequency counter connected to jack Bu 9.
Nominal value: 4,000,000 ± 40 Hz
If an alignment is necessary, use the trimmer C1 in the spectrum oscillator board 3 W669.

5.2.2. CHECKS ON THE OSCILLATOR II D370

5.2.2.1. Checking the Frequency Scale

Required settings: button T3 or T4 pushed
switch S7 "0 - 10 kHz"
the positions of all other controls are arbitrary.

Connect a frequency counter to jack Bu 10 by way of a coaxial cord. The measuring frequency f_{02}' shall be equal to the difference

of 60 kHz and the set frequency f_2, e.g. f_2 = 0 kHz corresponds to f'_{C2} = 60 kHz, f_2 = 10 kHz corresponds to f'_{02} = 50 kHz. In the case of deviations in excess of ± 30 Hz effect an alignment with trimmer C2, if the need arises a coarse alignment with trimmer C'0 in the interpolator board 1 W671 should be made.

5.2.2.2. Checking the Output Level at the Jacks Bu 10 and Bu D

Required settings: button T3 or T4 pushed
switch S7 "0 - 10 kHz"
all other control elements arbitrary.

Terminate the RF Multizet meter into 600Ω and measure the output voltages at the jacks Bu 10 and Bu D in the frequency range f_2 = -3 to 13 kHz. Nominal valueß 0.78 V ± 10%

5.2.2.3. Checking the Carrier Voltage for the Converter 2.4 MHz/100 kHz at the Clip-contact Strip $f_{30,31}$-$f_{28,29}$ (1)

Required settings: button T3 or T4 pushed
switch S7 "0 - 10 kHz"
the positions of all other controls are arbitrary.

Connect the RF Multizet meter to the clip-contact strip $f_{30,31}$-$f_{28,29}$ (1) and measure the carrier voltage (f_{02} = 2.303 - 2.287 MHz) in the frequency range f_2 = -3 to 13 kHz.
Nominal value: 0.27 V ± 10%

5.2.2.4. Checking the Synchronization Input Jack Bu C

Required settings: button T3 or T4 pushed
switch S7 "0 - 10 kHz"
the positions of all other controls are arbitrary.

When a coaxial cable is connected to jack C, the visual indicator Sz 2 must operate,i.e. show "red".
When feeding a level of 0 dB (0 Np, 0 dBm/600Ω) at a frequency of 60 kHz the visual indicator Sz2 must restore, e.g. the display becomes "green".

5.2.2.5. Checking the AFC Circuit

Required settings: button T3 or T4 pushed
switch S7 "0 - 10 kHz"

the positions of all other controls are arbitrary.

When feeding a level of 0 dB (0 Np, 0 dBm/600Ω) in the frequency range of 40 - 70 kHz the visual indicator Sz 2 must remain off (green).

5.2.2.6. Checking the Lock-in Point 0 kHz

Required settings: button T3 or T4 pushed
switch S7 "0 - 10 kHz"
the positions of all other controls are arbitrary.

Connect the frequency counter to jack Bu 10 and measure the output frequency.

Nominal value: 60,000 ± 0.6 Hz

In measuring, the time basis on the frequency counter must be set to 10 sec.

When the above tolerance is exceeded, proceed as under Item 5.2.1.6.

5.2.3. CHECKS ON THE LEVEL METER D354

5.2.3.1. Checking the Level Steps

For a better understanding of the switching of the measuring ranges with S3 by the attenuator networks brought into circuit in various combinations and the different gains let us give the following explanations.

Measuring Range Switching in the 'Wideband' Mode (button T2 pushed)

When the button T2 is pushed, the contacts of relay E and L establish a connection between the output of the measuring field and the input of the wideband amplifier with the superheterodyne section bypassed.

The measuring ranges are switched as follows:

by the 30-dB (4-Np) divider with the relays A and B

by the 40-, 20-, 0-dB (6-, 4-, 2-, 0-Np) divider with switches $S3^{III}$ and $S3^{IV}$,

by stepwise changes of the feedback in the preamplifier D636 with switch $S3^{VI}$.

Measuring Range Switching in the "Selective/Low-distortion" Measuring Mode (button T3 pushed)

When the button T3 is pushed, relays E and L are not energized so that the heterodyne section is interposed between the output of the measuring field and the wideband amplifier.

The measuring ranges are switched as follows:

by the 30-db (4-Np) divider with the relays A and B,
by 40-, 20-, 0-dB (6-, 4-, 2-, 0-Np) divider with switches $S3^{III}$ and $S3^{IV}$,
by stepwise changes of the negative feedback in the preamplifier D636 with switch $S3^{VII}$,
by switching the 20-, 10-, 0-dB (2-, 1-, 0-Np) divider with the relays H and J in the 100-kHz amplifier D647.

Measuring Range Switching in the "Selective/Low-noise" Measuring Mode (button T4 pushed)

The relays E and L are connected in the same way as in the "selective/low-noise" mode, e.g. the heterodyne section is interposed between the output of the measuring field and the wideband amplifier.

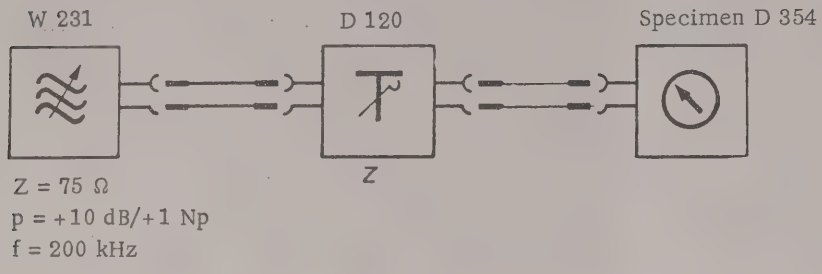
The measuring ranges are switched as follows:

by the 30-dB (4-Np) divider with relays A and B,
by the 40-, 20-, 0-dB (6-, 4-, 2-, 0-Np) divider with switches $S3^{III}$ and $S3^{IV}$,
by stepwise changes of the feedback in the preamplifier D636 with switch $S3^{VII}$,
by switching the 20-, 10-, 0-dB (2-, 1-, 0-Np) divider with the relays H and J in the 100-kHz amplifier D647,
by switching the 30-dB (4-Np) divider with the relay K in the 100-kHz amplifier D647.

Note

The circuit diagrams show all relays in a deenergized condition. The windings of the relays are marked with capital letters (e.g. A, B, C), and the related contacts with lower-case letters (e.g. a, b, c).

Measuring Circuit for Checking the Level Steps



Settings required on the specimen D 354:

S1: Z, coaxial

S2: 75 Ω

S3: according to checking table

S4: dB/Np

S5: 40 Hz

f_1= 200 kHz, S6: in spectrum steps

f_2= 0 kHz, S7: 0 kHz

The level steps of dB/dBm equipment are checked by reference to checking table 1, those of Np/Npm equipment according to checking table 2. When it is found that limits are exceeded, the dividers mentioned under "Notes" and the setting of the step-wise control feedback in the preamplifier, respectively, must be checked. If the specified individual tolerances are not exceeded, it is ensured that all level steps meet the data-bulletin value ± 0.1 dB/±0.01 Np (in the most sensitive range ± 0.3 dB/± 0.03 Np).

Consecutive No.	Attenuator a (dB)	Button T pushed	Measuring range (dB)	Indication on level meter (dB)	Notes
1	50	T2	-40	0	set with ▼I
2	60	T2	-50	0 ± 0.05	preamplifier v=20dB, alignment with R70 is possible
3	70	T2	-60	0 ± 0.05	preamplifier v=30dB, alignment with R74 is possible
4	30	T2	-20	0 ± 0.05	20-dB divider R20/R21
5	10	T2	0	0 ± 0.05	40-dB divider R22/R23
6	0	T2	+10	0 ± 0.05	30-dB divider R15/R16, relays A and B
7	40*	T3	-90	0	set with ▼II
8	10*	T4	-60	0 ± 0.05	30-dB divider R27/R28 in the 100-kHz amplifier, relay K
9	70	T4	-60	0	set with ▼II
10	60	T4	-50	0 ± 0.05	10-, 20-dB divider R13/R14/R31 in the 100-kHz amplifier, relays H, J
11	50	T4	-40	0 ± 0.05	
12	40*	T3	-90	0	set with ▼II
13	70*	T3	-120	0 ± 0.25	preamplifier v=40dB, alignment with R78 is possible

*lower the transmitting level to -50 dB

Table 1: Checking the level steps with information for fault location in the level meter D354 of the dB/dBm-model.

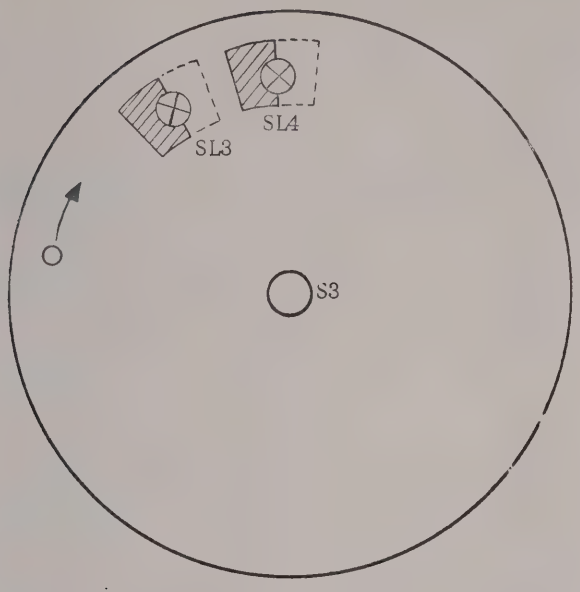
Consecutive No.	Attenuator a (Np)	Button T pushed	Measuring range (Np)	Indication on level meter (Np)	Notes
1	6	T2	-5	0	set with ▼I
2	7	T2	-6	0 ± 0.005	preamplifier v=2.6Np, alignment with R74 is possible
3	7*	T2	-7	0 ± 0.01	preamplifier v=3.6Np, alignment with R78 is possible
4	4	T2	-3	0 ± 0.005	2-Np divider R18/R19
5	2	T2	-1	0 ± 0.005	4-Np divider R20/R21
6	1	T2	0	0 ± 0.005	6-Np divider R22/R23
7	0	T2	+1	0 ± 0.005	4-Np divider R15/R16, relays A, B
8	5**	T3	-9	0	set with ▼II
9	1**	T4	-5	0 ± 0.005	4-Np divider R27/R28 in the 100-kHz amplifier, relay K
10	3**	T4	-7	0	set with ▼II
11	2**	T4	-6	0 ± 0.005	1-, 2-Np divider R13/R14/R31 in the 100-kHz amplifier, relays H, J
12	1**	T4	-5	0 ± 0.005	

*lower the transmitting level to 0 Np and repeat the measurement described in No. 1 at a = 5 Np ahead of point 3

**lower the transmitting level to -4 Np

Table 2: Checking the level steps with information for fault location in the level meter D354 of model Np/Npm.

5.2.3.2. Automatic Correction System (Koramat) of the Measuring Range Switch S3



Arrangement of the lamps of the automatic correction system

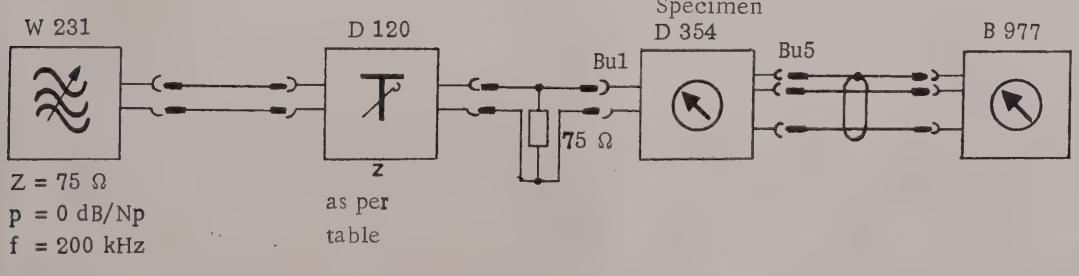
The lamps SL3 and SL4 in the 'Koramat' serve for distinct indication of the set measuring range. For each possible measuring range of the coaxial input (jack Bu 1) the lamp SL3 lights, and for each possible measuring range of the balanced input (jack Bu 2) and for the calibrating position "▼I, ▼II" the lamp SL4 is energized.

If the lamps are correctly controlled by the automatic correction system, the indication of the measuring range must agree with the tables in the circuit diagram on sheet 1. If they are not, first check the lamps and subsequently the wiring of the switches $S1^{II}$, $S3^{I}$, S4 and the pushbuttons T2, T3, T4 by reference to the circuit and wiring diagrams for possible interruptions.

When switch S4 is set to power level dBm/Npm the linkage system on the switches S3/S4 rotates the disk with the two transparent scale windows by one detent position in the direction of the arrow (see Fig.). This brings into view a measuring range whose sensitivity is lower by 10 dBm/1 Npm.

5.2.3.3. Checking the Divider for the Power Levels

Measuring Circuit for Checking the Divider



Settings required on specimen D354:

S1: 10 kΩ‖ 60 pF

S2: according to checking table

S3: -50 dB/-6 Np

S4: by reference to checking table

T2 pushed

The check must be carried out on the equipment of model dB/dBm by reference to checking table 1, and on equipment of model Np/Npm by reference to checking table 2. When limits are exceeded, check the divider resistance R35 to R42 in the preamplifier D636.

Note: If no attenuator with attenuation 0.01-dB (0.001-Np) steps is available, these residual values must be read on the scale-spread device and correspondingly be taken into account in the measurement result. For instance, a setting of the attenuator for Z = 150Ω a = 46.0 dB instead of a = 46.02 dB results in a nominal value on the scale-spread device of +0.02 dB instead of 0.00 dB.

Attenuator a	Switch S2	S...in position S3	S4	Indication on the scale-spread device B977	Note
50.00 dB	600Ω	-50dB	dB	0 dB	to be set on the scale-spread device
40.00 dB	600Ω	-40dBm	dBm	≤0.08dB	
46.02 dB	150Ω				
46.32 dB	140Ω				
46.48 dB	135Ω				
46.81 dB	125Ω				
49.03 dB	75Ω				

Table 1: Checking the divider for power levels in the level meter D354 of model dB/dBm.

Attenuator a	Switch S2	S...in the position S3	S4	Indication on the scale-spread device B977	Notes
6.000Np	600Ω	-6Np	Np	0 Np	to be set on the scale-spread device
5.000Np	600Ω	-5Npm	Npm	≦0.008Np	
5.691Np	150Ω				
5.725Np	140Ω				
5.750Np	135Ω				
5.783Np	125Ω				
6.036Np	75Ω				

Table 2: Checking the divider for power levels in the level meter D354 of model Np/Npm.

5.2.3.4. Checking the Measuring Circuit

Calibrate the level meter in the wideband mode (▼I) and measure the dc voltage with nominal deflection (zero mark on the instrument) with a digital voltmeter at the dc output jack Bu 6 between the wires a and b with termination into 2.5 kΩ ± 0.5%.
Nominal value: 194 mV ± 2%
If the need arises, make an alignment with R15 in board 9 'power amplifier and demodulator D649'.

With the above setting an output level of 0 ± 0.1 dB (0 ± 0.01Np) must be measured when a calibrating level meter with Z = 75Ω is connected to the measuring output jack Bu7. If the need arises make an alignment with R35 in board 9 'power amplifier and demodulator D649'.

5.2.3.5. Checking and Aligning the Calibrating Voltages

5.2.3.5.1. Checking the Calibrating Voltage for Wideband Measurements

Settings required on the specimen D354:

S1: 10 kΩ ‖ 60 pF

S2: 600Ω

S3: 0 dB/Np

S4: dB or dBm, Np or Npm

S5: 40 Hz

T2 pushed

Measuring circuit:

Connect the calibrating level meter across the coaxial input (Bu 1) of the level meter and feed a signal of accurately 0 dB/Np with the level oscillator ($Z \sim 0\Omega$, f = 100 kHz). Adjust the level meter deflection to the 0 dB/Np (▼) division with the control "▼I".

Checking and aligning:

Operate the range switch S3 to position "▼". The calibrating voltage is in order when the instrument pointer likewise is at the calibrating mark "▼" 0 dB/Np.

If deviations are detected, adjust the deflection on the meter to the calibrating mark with R20 in board 2 'calibrating oscillator D641'.

5.2.3.5.2. Checking the Calibrating Voltage for Selective Measurement

Settings required on level meter and measuring circuit:

Settings and feed-in as under 5.3.3.5.1; push the button T4, frequency control f_1 = 100 kHz with lock-in and tune f_2 for maximum indication, adjust the control "▼II" for a deflection of 0 dB/Np on the instrument.

Check:

Operate the measuring range switch S3 to position "▼" and align the frequency control f_2 for maximum meter deflection. If the divider for the calibrating voltage is correct, the instrument pointer returns to the calibrating mark ▼(0 dB/Np).

If the deviations exceed 0.05 dB(0.005 N_p) check the divider resistors R28,29,31,32,33,34 in the calibrating oscillator D641.

5.2.3.6. Checking the Level at the Dynamic Output, Jack Bu 4

Feed a level-oscillator signal of -20 dB/dBm and -2 Np/Npm, respectively, and f = 100 kHz into the coaxial or balanced input.
Settings required on the level meter D354:
S1: at option Z coaxial or balanced
S2: corresponding to the Z-value on the level oscillator
S4: dB or dBm, Np or Npm
S5: 1600 Hz
T3 or T4 pushed
f_1 = 100 kHz, S6: with lock-in
f_2 = 0 kHz, S7: 0 kHz
S3: to be set to the red dot

Connect the level meter with Z = 600Ω to jack Bu 4 and measure the IF-level at 100 kHz.
Nominal value: -20 ± 0.1 dB/-2 Np ± 0.01 Np
The nominal value can be set with control P3.

5.2.3.7. Checking the Input Balance

Effect a selective calibration (▼II) of the level meter and select with switch S1 the balanced input of high impedance, set 600Ω with switch S2, short-circuit the a- and b-wires of the balanced input Bu 2 and feed between a/b and the c-wire a level-oscillator signal (Z∼0) of 0 dB/Np and 600 kHz.
Increase the level meter sensitivity with S3 until a well-readable meter deflection results. The magnitude of the indicated level equals the common-mode suppression of the balanced input.
Nominal value: a_s = 40 dB/4.6 Np
The nominal value must be met with wideband and selective measurement (T2, T3 or T4 pushed). The common-mode suppression can be optimized with L1, L2 and R11 in the input subassembly D631.

5.2.3.8. Checking the Residual Distortion Attenuation

The residual distortion attenuation can only be checked when a measuring voltage of low distortion is available. The harmonics should be down by at least $\geq$ 100 dB, or otherwise the measurement result will be falsified.

Feed a transmitting level of 0 dB (dBm, Npm) and low distortion into the input of the level meter. Push the button T3 "low-distortion". Measure the level of the fundamental wave; subsequently tune the level meter in succession to the double and the triple of the generator frequency and measure the respective levels of these harmonics (a_{k2}, a_{k3}). In so doing increase the sensitivity with the range switch S3, but by not more than 60 dB (7 Np). The difference between the fundamental and the harmonic levels (a_{k2} and a_{k3}) shall be $\geq$ 80 dB (9 Np).

Note: If no source of measuring current with sufficiently low distortion is available, interpose a low-pass filter between level oscillator and level meter.

5.2.3.9. Checking the 100-kHz IF Filter

5.2.3.9.1. Curve Shape

Feed from level oscillator W231 a signal of 0 dB/Np, f_1 = 100 kHz, S6: with lock-in, f_2 = 0 kHz, S7: 0 - 10 kHz and tune for maximum indication of the level meter D354 with a pass band width of 10 Hz selected with switch S5.

Now change the level oscillator tuning condition and check the shape of the selectivity curves with S5 set to 10 Hz, 40 Hz and 1600 Hz, corresponding to the electrical data on p.8 in the pass band and in the stop band. In so doing, do not change the tuning condition of the level meter. For the measurements in the stop band the sensitivity must be increased with the measuring range switch S3 to an extent that the level meter shows a well readable deflection.

5.2.3.9.2. Level Control

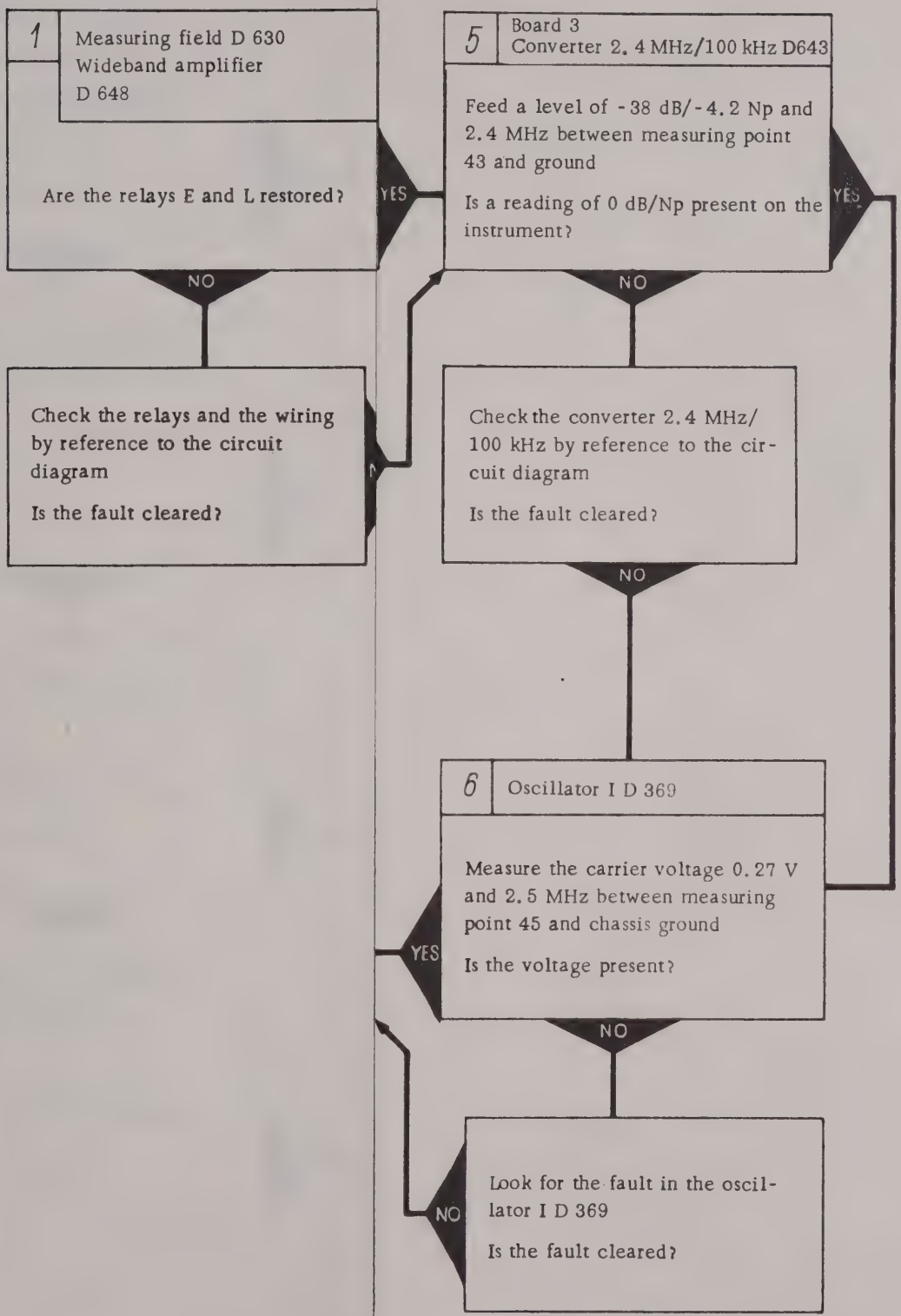
With a pass-band width of 10 Hz selected with S5, effect the calibration "▼II", subsequently switch S5 to 40 Hz and 1600 Hz and read the corresponding deflections on the meter. It shall remain uniform with the three pass-band filters. In the case of level differences in excess of 0.05 dB (0.005 Np) as referred to the 40-Hz filter, the nominal level must be set in the crystal filter I D644 (10 Hz) and in the inductor type filter D646 with the potentiometer R3.

Setting:

▼ II in mid-position
f_1 = 100 kHz, S6: with lock-in
f_2 = 0 kHz, S7: 0 Hz

T4:
S3:
S4:
S5:

and connecting points see
2, B602-x-7411
2-x-7402



selective (T3 or T4 pushed)
idths (10 Hz, 40 Hz, 1 600 Hz)

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Feed a transmitting level of 0 dB (dBm, Npm) and low distortion into the input of the level meter. Push the button T3 "low-distortion". Measure the level of the fundamental wave; subsequently tune the level meter in succession to the double and the triple of the generator frequency and measure the respective levels of these harmonics (a_{k2}, a_{k3}). In so doing increase the sensitivity with the range switch S3, but by not more than 60 dB (7 Np). The difference between the fundamental and the harmonic levels (a_{k2} and a_{k3}) shall be $\geq$ 80 dB (9 Np).

Note: If no source of measuring current with sufficiently low distortion is available, interpose a low-pass filter between level oscillator and level meter.

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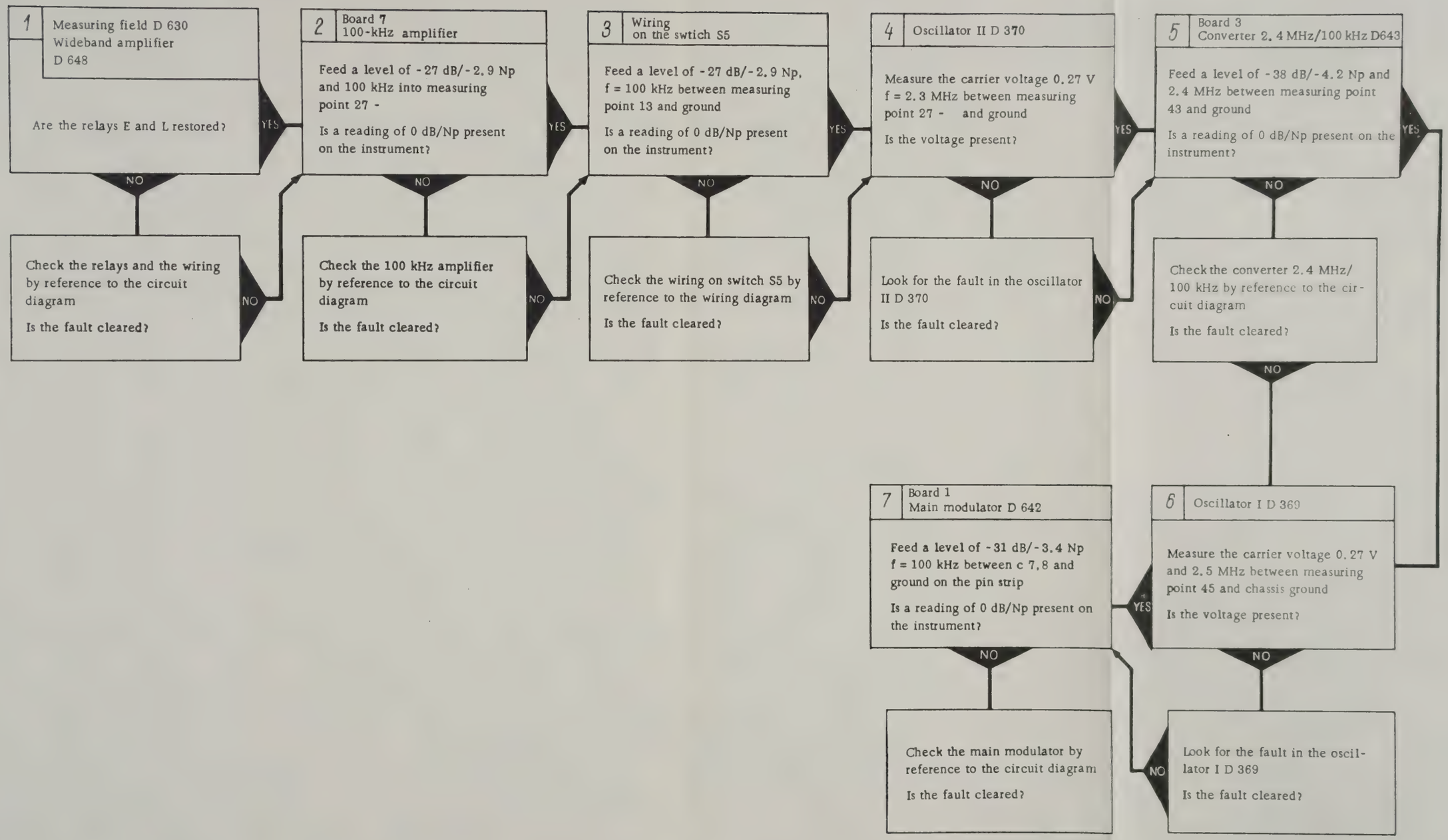
5.2.3.9.2. Level Control

With a pass-band width of 10 Hz selected with S5, effect the calibration "▼II", subsequently switch S5 to 40 Hz and 1600 Hz and read the corresponding deflections on the meter. It shall remain uniform with the three pass-band filters. In the case of level differences in excess of 0.05 dB (0.005 Np) as referred to the 40-Hz filter, the nominal level must be set in the crystal filter I D644 (10 Hz) and in the inductor type filter D646 with the potentiometer R3.

Setting:

▼ II in mid-position
f_1 = 100 kHz, S6: with lock-in
f_2 = 0 kHz, S7: 0 Hz
T4: pushed
S3: 0 dB/Np
S4: dB/Np
S5: 1 600 kHz

For the measuring and connecting points see
S45034-D354-B302, B602-x-7411
S45034-D354-B602-x-7402



Fault location, symptoms: Measuring selective (T3 or T4 pushed) is not possible with all 3 pass-band widths (10 Hz, 40 Hz, 1 600 Hz) and with ▼ II.

Annexed Fig. 2

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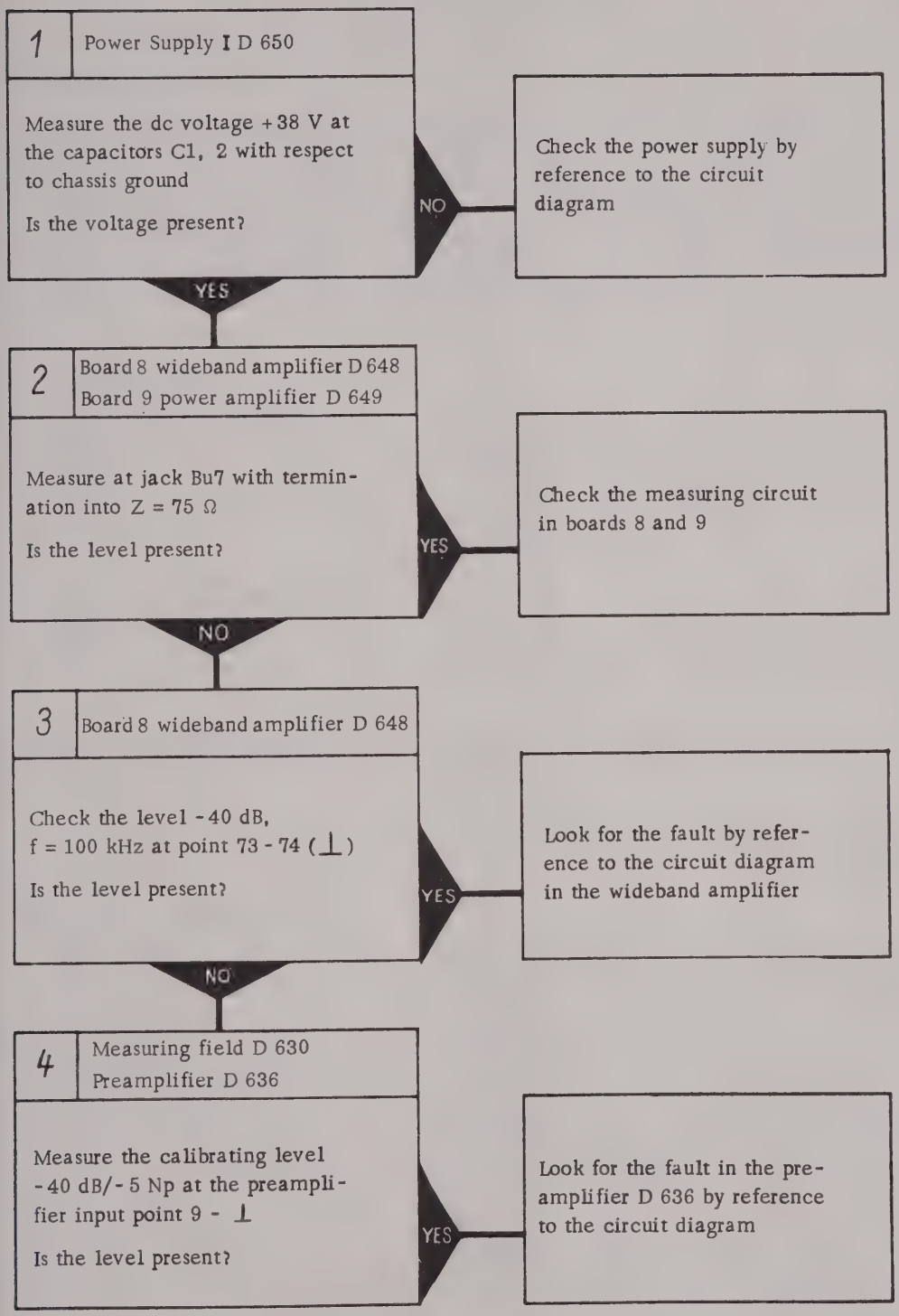
SIEMENS

Setting:

Control "▼ I" in mid-position
Push button T2

For the measuring and connecting points see
S45034-D354-B302, B 602-x-7411
S45034-D354-B602-x-7402



Fault location, symtoms: calibrating I and II, measurement wideband, selective low-distortion and selective low-noise are not possible

Annexed Fig. 1

5. S T Ü C K L I S T E

Vorbemerkung

Unter Symbol stehen die in den Stromläufen verwendeten Abkürzungen für die Bauteile in alphabetischer und - soweit möglich - in numerischer Reihenfolge. Mit Stück ist die Anzahl der gleichen Bauteile innerhalb der Geräte oder der Baugruppe bezeichnet. In der Spalte Gegenstand sind ausser dem Namen des Bauteils auch seine Hauptkennwerte angegeben. Mit der Bestellnummer ist das Bauteil durch einen Abkürzungs-Code oder eine Bauvorschrift eindeutig gekennzeichnet.

Es bedeuten:

bei einem Widerstand: 300 kΩ ±5 %; 0,5 W
- 300 kΩ . . . . . Nennwert des Widerstandes
- ±5 % . . . . . Toleranz des Nennwiderstandes
- 0,5 W . . . . . Belastbarkeit bezogen auf Umgebungstemperatur 20°C

bei einem Kondensator: 1000 pF ±20 %; 125 V-
- 1000 pF . . . . . Nennwert der Kapazität (1 pF = µµF = 10^{-12} F)
- ±20 % . . . . . Toleranz der Nennkapazität
- 125 V- . . . . . zulässige Betriebsgleichspannung

bei einem Übertrager:

Wicklg.I (1a,2a,3a)	Wicklg.II (rtsw,gesw, rtgn,gegnsw)+
440 Wdg 0,1 CuL 75 Ω	
228 µH ±2 %	720 Wdg HFL SS 60x0,03 35Ω
Abgriff(2a): 210 Wdg	1.Abgriff (gesw): 46 Wdg
	2.Abgriff (rtgn): 190 Wdg

Wicklg.I (1a,2a,3a)
- 440 Wdg . . . . . 440 Windungen, Anfang Lötöse 1a, Ende 3a;
- 0,1 CuL . . . . . aus Kupferdraht (Cu); 0,1 mm Ø; lackisoliert (L)
- 75 Ω . . . . . Gleichstromwiderstand der Wicklung I
- 228 µH . . . . . Induktivität
- Abgriff(2a): 210 Wdg . . Abgriff bei der 210.Windung, Lötöse 2a

Wicklg.II — sinngemäss wie bei Wicklung I
- HFL SS 60x0,03 . . . . . Hochfrequenzlitze 2fach seidenumsponnen (SS), aus Kupferdraht 60x0,03 mmØ

bei einem Gleichrichter: 50 V/250 mA
- 50 V . . . . . Anschluss-Wechselspannung
- 250 mA . . . . . entnehmbarer Betriebsstrom

+ Farbkurzzeichen

bl = blau	ge = gelb	gr = grau	sw = schwarz	rs = rosa
br = braun	gn = grün	rt = rot	ws = weiss	rtsw = rot/schwarz

5. PARTS LIST

Introductory remark

The "SYMBOL" column shows the abbreviations used in the circuit diagrams in alphabetic and, to the extent possible, numerical order. "QTY" denotes the number of identical components within the devices or the subassembly. The "DESCRIPTION" column gives, apart from the designation of the components, its principal characteristic data. The "ORDER NUMBER" column designates the component nonambiguously by an abbreviation code or a component specification.

There denotes, for instance

with a resistor:	300 kΩ ±5%; 0,5 W
300 kΩ	Nominal value of the resistance
±5%	Tolerance of the nominal resistance
0,5 W	Wattage rating, as referred to an ambient temperature of 20°C
with a capacitor:	1000 pF ±20%; 125 V-
1000 pF	Nominal value of the capacitance (1 pF = 1 µµF = 10^{-12} F)
±20%	Tolerance of the nominal capacitance
125 V-	Permissible DC operating voltage

with a transformer:

Wicklg. I(1a,2a,3a)	Wicklg. II(rtsw,gesw, rtgn,gegnsw)+
440 Wdg 0,1 CuL 75 Ω	720 Wdg HFL SS 60x0,03 35 Ω
228 µH ±2%	1.Abgriff(gesw): 46 Wdg
Abgriff(2a): 210 Wdg	2.Abgriff(rtgn): 190 Wdg

Wicklg.I(1a,2a,3a)	
440 Wdg	440 turns, start soldering lug 1a, end 3a
0,1 CuL	of copper wire (Cu); 0.1 mm dia., enamelled (L)
75 Ω	DC resistance of winding I
228 µH	Inductance
Abgriff(2a):210Wdg	Tap at soldering lug 2a at the 210th turn
Wicklg. II . . .	Analogously to winding I
HFL SS 60x0,03 .	RF copper Litz wire, with double silk covering, 60x0.03 mm dia.
with a rectifier:	50 V/250 mA
50 V	Primary AC voltage
250 mA	Available operating current

+Color symbols

bl = blue	ge = yellow	gr = gray	sw = black	rs	= pink
br = brown	gn = green	rt = red	ws = white	rtsw	= red/black

Pegelmesser 0,2...1600 kHz S45034-D354-B302, B602
LEVEL METER 0,2...1600 kHz

Ausführung -D354-B302: dB/dBm Eichung, MODEL dB/dBm CALIBRATION
Ausführung -D354-B602: Np/Npm Eichung, MODEL Np/Npm CALIBRATION

Symbol SYMBOL	Stck QTY		Gegenstand DESCRIPTION	Bestellangabe ORDERING DATA	Seite PAGE
	für Ausfg. FOR MODEL				
	-B302	-B602			
	1	1	Verdrahtungsleiterplatte I PRINTED-CIRCUIT BOARD I	S45035-D654-B701	
	1	1	Verdrahtungsleiterplatte II PRINTED-CIRCUIT BOARD II	S45035-D653-A701	
	1		Meßfeld MEASURING FIELD	S45035-D630-B301	5.3
		1	Meßfeld MEASURING FIELD	S45035-D630-B601	5.3
	1	1	Adapter TEST-ADAPTER	S45035-D640-A702	
Pl.1	1	1	Hauptmodulator MAIN MODULATOR	S45035-D642-A701	5.5
Pl.2	1		Eichoszillator CALIBRATING OSCILLATOR	S45035-D641-B101	5.6
Pl.2		1	Eichoszillator CALIBRATING OSCILLATOR	S45035-D641-B401	5.6
Pl.3	1		Umsetzer 2,4 MHz/100 kHz CONVERTER 2,4 MHz/100kHz	S45035-D643-A101	5.6
Pl.3		1	Umsetzer 2,4 MHz/100 kHz CONVERTER 2,4 MHz/100 kHz	S45035-D643-A401	5.6
Pl.4	1	1	Quarz-Filter I CRYSTAL FILTER I	S45035-D644-A701	5.7
Pl.5	1	1	Quarz-Filter II CRYSTAL FILTER II	S45035-D645-A701	5.7
Pl.6	1	1	100-kHz-Filter 100-kHz-FILTER	S45035-D646-B701	5.8
Pl.7	1		100-kHz-Verstärker 100-kHz-PREAMPLIFIER	S45035-D647-B101	5.8
Pl.7		1	100-kHz-Verstärker 100-kHz-PREAMPLIFIER	S45035-D647-B401	5.8
Pl.8	1	1	Breitbandverstärker WIDEBAND AMPLIFIER	S45035-D648-B701	5.8
Pl.9	1	1	Leistungsverstärker und Demodulator POWER AMPLIFIER AND DEMODULATOR	S45035-D649-A701	5.8
	1	1	Netzteil I POWER SUPPLY UNIT I	S45035-D650-A701	5.9
Pl.10	1	1	Netzteil II POWER SUPPLY UNIT II	S45035-D651-A701	5.10
	1	1	Oszillator I OSCILLATOR I 0...1600 kHz	S45034-D369-A702	5.11
	1	1	Oszillator II OSCILLATOR II 0...10 kHz	S45034-D370-A702	5.14
	1	1	Platte für koax-Stecker 2,5/6 (Bu1) MOUNTING FOR JACK 2,5/6 (Bu1) in Ersatzteilbehälter enth. INCLUDED IN CONTAINER FOR SPARES	C44326-A14-C98	
	1	1	Metallgehäuse SHEET-METAL CASING	C44165-A12-A3	
	2	2	Druckstück PRESSING UNIT	Rel bschl 29c	
			Schichtwiderstand LAYER-TYPE RESISTOR		
R1	1	1	330 Ohm ±5%; 0,33W	B54413-A2331-J	
R2	1	1	150 Ohm ±5%; 0,33W	B54413-A2151-J	
			Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR		
P1,2	2	2	200 Ohm ±20%; 0,1W; lin	W40102-H8201-M001	
P3	1	1	500 Ohm ±20%; 0,1W; lin	W40951-B8501-M001	
	1	1	Kappe CAP	Rel mse 348, T216	
C1	1	1	MKL-Kondensator MKL-CAPACITOR 0,68 µF ±20; 63V	B32110-E9684-M	
C2,3 C4	3	3	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 4,7 µF ±20%; 35V	B45170-A4475-M	
			UKW-Drossel VHF-REACTOR		
L1,4	2	2	55 nH/0,5A	B82501-A-C26	
L3	1	1	23 nH/0,5A	B82501-A-C16	
			Schaltbuchse SWITCHING-JACK		
Bu3	1	1		C44334-Z11-C1	
Bu4	1	1		C42334-A76-A34	
	1	1	Buchse JACK	C42334-F3-C1	
	1	1	Flachbeutel f.Kabel CABLE-CONTAINER	V45030-T1	
	1	1	Netzanschlußleitung POWER CORD	V45594-F4-A522	
	1	1	Anschlußleitung für Instr. (200mm rot) CONNECTING CORD FOR INSTRUMENT (RED)	V42257-R17-C13	
	1	1	Anschlußleitung für Instr. (200mm blau) CONNECTING CORD FOR INSTRUMENT (BLUE)	V42257-R17-D13	
S5	1	1	Bandbreitenschalter BANDWIDTH-SWITCH	C44315-A14-A6	
J	1	1	Drehspul-Tubus-Instrument MOVING-COIL INSTRUMENT Ms sdr 578 Bv1 Pos.1 40 µA	V70349-A578-A1	
Si	2	2	Schmelzeinsatz 110/130V FUSE-LINK FOR 110/130V M 0,63 C DIN 41571	D41571-M630-C2	
Si	3	3	Schmelzeinsatz 220/240V FUSE-LINK FOR 220/240V M 0,315 C DIN 41571	D41571-M315-C2	
	2	2	Signallampe SIGNAL LAMP	Fg lp 62be	
	1	1	Lampenzieher LAMP EXTRACTOR	C44121-A9-C1	
	1	1	Sechskantstiftschlüssel HEXAGONAL SOCKET-WRENCH	D911-A15	
	1	1	Blende farblos, matt. LAMP CAP COLOURLESS, FROSTED	Fg lp 68a	
	2	2	Blende CAP	C44300-A7-C4	
			Drehknopf ROTARY KNOB		
	2	2		C44106-A1-A2	
	1	1		C44326-A6-B11	
	1	1	Knebelgriff KNOB	Rel antr 93c	
	2	2	Federleiste CLIP-CONTACT STRIP 31p	C42334-A56-A1	
	1	1	Keram. Lötstützpunkt CERAMIC SOLDERING CONNECTION POINT	Rel ltg 519i	

Meßfeld S45035-D630-B301, B601
MEASURING FIELD

für Ausfg. FOR MODEL -B301	-B601		
1		Eingangsbaugruppe INPUT SUBASSEMBLY	S45035-D631-A101
	1	Eingangsbaugruppe INPUT SUBASSEMBLY	S45035-D631-A401
S3 1		Meßbereichschalter LEVEL RANGE SWITCH	S45035-D634-B101
S3	1	Meßbereichschalter LEVEL RANGE SWITCH	S45035-D634-B401
1		Trennstufe BUFFER STAGE	S45035-D635-A101
	1	Trennstufe BUFFER STAGE	S45035-D635-A401
1		Vorverstärker PREAMPLIFIER	S45035-D636-A101
	1	Vorverstärker PREAMPLIFIER	S45035-D636-A401
1		Relaisplatte RELAY BOARD	S45035-D637-A101
	1	Relaisplatte RELAY BOARD	S45035-D637-A401
1	1	Beleuchtungsfeld ILLUMINATION-FIELD	C44249-A51-B4
2	2	Lampenfassung LAMP HOLDER	C44249-A17-B21

T2/3 T4	1	1	Drucktastenschalter PUSHBUTTON SWITCH	C44315-Z2-C2
S4	1	1	Drehschalter ROTARY SWITCH	C42315-A17-A40
SL3,4	2	2	Signallampe SIGNAL LAMP 24V/0,6W	Fg lp 62be
			Keramik-Kondensator CERAMIC CAPACITOR	
C9	1	1	...pF Wert wie eingebaut VALUE AS MOUNTED	B38212-
C13	1	1	5pF ±0,5pF; 500V	B38212-J5050-D 1)
[illegible]	1		5pF ±0,5pF; 500V	B38212-J5050-D 1)
C17		1	10pF ±0,5pF; 500V	B38212-J5100-D 1)
C20		1	5pF ±0,5pF; 500V	B38212-J5050-D 1)
			1) = Wert wie eingebaut VALUE AS MOUNTED	
C46.. C51	6	6	Tantal-Elko TANTALUM ELEC[illegible]TIC CAPACITOR 4,7 /uF ±20%; 35V	B45170-A4475-M
C52	1	1	MKL-Kondens MKL-CAPAC	B32110-E9105-M
C8,12 C16	3	3	Luft-Trimm[illegible]r AIR DI[illegible]EC IC TRIMMER 2,1...13pF	Rel ko 131i
C11		1	2,1...13pF	Rel ko 131i
Gr7,8	2	2	Silizium-Diode SILICON DIODE DX 6393	Q62702-A110-F7

Eingangsbaugruppe S45035-D631-A101, A401
INPUT SUBASSEMBLY

	für Ausfg. FOR MODEL -A101	-A401		
S1	1	1	Eingangswahlschalter INPUT SELECTOR SWITCH	S45035-D632-A701
S2	1	1	Z-Schalter IMPEDANCE SWITCH	S45035-D633-A701
	1	1	Schaltebene DECK	C42315-A400-B2
R10	1	1	Schichtwiderstand LAYER-TYPE RESISTOR 12 Ohm ±5%; 0,33W	B54413-A2120-J 1)
R14	1	1	350 Ohm ±5%; 0,33W 1)= Wert wie eingebaut VALUE AS MOUNTED	B54413-A2351-J 1)
			Schichtwiderstand LAYER-TYPE RESISTOR	
R15	1		9,684kOhm ±0,2%; 0,15W	B51264-A9962-C840
R15		1	9,817kOhm ±0,2%; 0,15W	B51264-A9982-C170
R16	1		326,2 Ohm ±0,2%; 0,15W	B51264-A9321-C620
R16		1	186,6 Ohm ±0,2%; 0,15W	B51264-A9181-C660
R11	1	1	Drahtdrehwiderstand WIRE-WOUND VAR RESISTOR 25 Ohm ±5%; 1W	W40109-B8250-J008
			Eingangs-Übertrager INPUT - TRANSFORMER	
Ü1	1		Wicklg. I (1a,7a) 29 Wdg. 3x0,21 CuL paral.; 0,31 Ohm	Rel Bv 621 E 3316
			Wicklg.II (1b,7b) 280 Wdg. 0,06 CuL; 140 Ohm	
Ü1		1	Wicklg. I (1a,7a) 39 Wdg. 3x0,15 CuL paral.; 0,93 Ohm	Rel Bv 621 E 3315
			Wicklg.II (1b,7b) 280 Wdg. 0,06 CuL; 140 Ohm	
L1,L2	2	2	Spule COIL Rel sp 71b	Rel Bv 623 M 3060
C1	1	1	Kf-Kondensator PLASTIC-FOIL CAPACITOR 50pF ±1%; 500V	B31141-A5500-F 1)
C2	1	1	MKL-Kondensator MKL-CAPACITOR 4,7 /uF ±20%; 63V	B32110-E9475-M
			1)= Wert wie eingebaut VALUE AS MOUNTED	
C4	1	1	Keramik-Kondensator CERAMIC CAPACITOR 5pF ±0,5pF; 500V	B38212-A5050-D 1)
C5	1	1	Glimmer-Kondensator MICA-CAPACITOR 430pF ±2%; 500V	B34212-A5431-G
			Keramik-Kondensator CERAMIC CAPACITOR	
C7	1		18pF ±5%; 500V	B38216-J5180-J 1)
C7		1	27pF ±5%; 500V	B38216-J5270-J 1)
C10	1	1	Tantal-Elko TANTALUM ELECTRLYTIC CAPACITOR 4,7/uF ±20%; 35V	B45170-A4475-M
			Lufttrimmer AIR-DIELECTRIC TRIMMER	
C3	1	1	2,0...11pF	Rel ko 131ad
C6	1	1	2,1...13pF	Rel ko 131i
			1) = Wert wie eingebaut VALUE AS MOUNTED	
	1	1	Buchseneinheit JACK PLATE	Rel kli 6a
	1	1	Buchse JACK 1,6/5,6	C42334-A76-A14
A,B	2	2	S-G-Relais DRY-REED RELAY Rel rls 28a	Rel Bv 662 E 31
Gr1	1	1	Diode DIODE AA 118	Q60101-A118

Eingangswahlschalter S1 S45035-D632-A701
INPUT SELECTOR SWITCH S1

S1	1		Drehschalter ROTARY SWITCH	C40315-M302-B2

Z-Schalter S2 S45035-D633-A701
IMPEDANCE SWITCH S2

S2	1		Drehschalter ROTARY SWITCH	C44315-A14-A4
			Schichtwiderstand LAYER-TYPE RESISTOR	
R1	1		75,6 Ohm ±0,5%; 1W	B54415-A9750-D600
R2	1		125 Ohm ±0,5%; 0,5W	B54414-A9121-D500
R3	1		135 Ohm ±0,5%; 0,5W	B54414-A9131-D500
R4	1		140 Ohm ±0,5%; 0,5W	B54414-A9141-D
R5	1		150 Ohm ±0,5%; 0,5W	B54414-A9151-D
R6	1		600 Ohm ±0,5%; 0,33W	B54413-A9601-D
R7	1		1,7 Ohm ±5%; 0,5W	B54414-A2010-J700
R8	1		2,15 Ohm ±5%; 0,5W	B54414-A2020-J150
R9	1		39 Ohm ±5%; 0,5W	B54414-A2390-J

Meßbereichschalter S3 S45035-D634-B101, B401
LEVEL RANGE SWITCH S3

	für Ausfg. FOR MODEL -B101	-B401		
S3	1	1	Schalter SWITCH	C44315-A12-A23
			Schichtwiderstand LAYER-TYPE RESISTOR	
R18		1	8,647kOhm ±0,2%; 0,15W	B51264-A9862-C470
R20	1		9kOhm ±0,2%; 0,15W	B51264-A9902-C
R20		1	9,817kOhm ±0,2%; 0,15W	B51264-A9982-C170
R22	1		9,9kOhm ±0,2%; 0,15W	B51264-A9992-C
R22		1	9,975kOhm ±0,2%; 0,15W	B51264-A9992-C750
Gr5,6	2	2	Silizium-Diode SILICON DIODE DX 6393	Q62702-A110-F7

Trennstufe S45035-D635-A101, A401
BUFFER STAGE

	für Ausfg. FOR MODEL -A101	-A401		
			Schichtwiderstand LAYER-TYPE RESISTOR	
R19		1	1,565kOhm ±0,2%; 0,15W	B51264-A9152-C650
R21	1		1,111kOhm ±0,2%; 0,15W	B51264-A9112-C110
R21		1	186,6 Ohm ±0,2%; 0,15W	B51264-A9181-C660
R23	1		101 Ohm ±0,2%; 0,15W	B51264-A9101-C100
R23		1	24,85 Ohm ±0,2%; 0,15W	B51264-A9240-C850
R27,28	2	2	20kOhm ±1%; 0,1W	B51263-A9203-F
R30,33	2	2	220 Ohm ±5%; 0,33W	B54413-A2221-J
R31	1	1	3,9kOhm ±5%; 0,25W	B51263-A2392-J
R32	1	1	150 Ohm ±5%; 0,33W	B54413-A2151-J
R29	1	1	Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR 2kOhm ±20%; 1W; lin	W40955-A8202-M001
	1	1	Staubschutzkappe PROTECTION CAP	C44408-Z3-C3

C15	1		Keramik-Kondensator CERAMIC CAPACITOR 80pF ±5%; 500V	B38226-J5800-J
C15		1	Glimmer-Kondensator MICA CAPACITOR 470pF ±5%; 500V	B34212-A5471-J
			Glimmer-Kondensator MICA CAPACITOR	
C19	1		900pF ±2%; 300V	B34212-A3901-G
C19		1	2600pF ±2%; 500V	B34214-A5262-G
C21		1	Keramik-Kondensator CERAMIC CAPACITOR 50pF ±5%; 500V	B38226-J5500-J
C22	1	1	MKL-Kondensator MKL-CAPACITOR 4,7/uF ±20%; 63V	B32110-E9475-M
C23	1	1	Keramik-Kondensator CERAMIC CAPACITOR 6pF ±0,5pF; 500V	B38212-A5060-D
C24	1	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 47/uF ±20%; 20V	B45170-A3476-M
			Lufttrimmer AIR-DIELECTRIC TRIMMER	
C14,18	2	2	2,5...11pF	Rel ko 131f
C25		1	2,5...11pF	Rel ko 131f
Ts1,2	2	2	Transistor TRANSISTOR 2 N 2219	Q62702-S0003
	2	2	Halterung MOUNTING	C42121-A11-C6
	4	4	Isolierperle BEAD	C42187-Z7-C2

Vorverstärker S45035-D636-A101, A401
PREAMPLIFIER

			Schichtwiderstand LAYER-TYPE RESISTOR	
R35	1		32,8 Ohm ±0,2%; 0,15W	B51264-A9320-C800
R36	1		57,4 Ohm ±0,2%; 0,15W	B51264-A9570-C400
R36		1	32,63 Ohm ±0,2%; 0,15W	B51264-A9320-C630
R37	1		188 Ohm ±0,2%; 0,15W	B51264-A9181-C800
R37		1	167 Ohm ±0,2%; 0,15W	B51264-A9161-C700
R38	1		25,7 Ohm ±0,2%; 0,15W	B51264-A9250-C700
R38		1	27,72 Ohm ±0,2%; 0,15W	B51264-A9270-C720
R39	1		12,2 Ohm ±0,2%; 0,15W	B51264-A9120-C200
R39		1	12,93 Ohm ±0,2%; 0,15W	B51264-A9120-C930
R40	1		22 Ohm ±0,2%; 0,15W	B51264-A9220-C
R40		1	24 Ohm ±0,2%; 0,15W	B51264-A9240-C
R41		1	365 Ohm ±0,2%; 0,15W	B51264-A9361-C500
R41,42	2		331 Ohm ±0,2%; 0,15W	B51264-A9331-C100
R42		1	370,7 Ohm ±0,2%; 0,15W	B51264-A9371-C070
R44,45	2	2	10kOhm ±1%; 0,1W	B51263-A9103-F
R46,54 R66	3	3	220 Ohm ±5%; 0,33W	B54413-A2221-J
R47,53	2		3,9kOhm ±5%; 0,25W	B51263-A2392-J
R47,49 R53		3	3,9kOhm ±5%; 0,25W	B51263-A2392-J
R48	1	1	27kOhm ±5%; 0,25W	B51263-A2273-J
R49		1	4,7kOhm ±5%; 0,25W	B51263-A2472-J
R50	1	1	2,7kOhm ±5%; 0,25W	B51263-A2272-J
R51	1		800 Ohm ±1%; 0,33W	B54413-A9801-F
R51		1	500 Ohm ±1%; 0,33W	B54413-A9501-F
R55,64	2	2	18kOhm ±5%; 0,25W	B51263-A2183-J
R56	1	1	5,6kOhm ±5%; 0,25W	B51263-A2562-J
R57,63	2	2	1,8kOhm ±5%; 0,25W	B51263-A2182-J
R58	1	1	150 Ohm ±5%; 0,33W	B54413-A2151-J
R59	1	1	470 Ohm ±5%; 0,33W	B54413-A2471-J
R60	1		2kOhm ±1%; 0,1W	B51263-A9202-F
R60		1	2,2kOhm ±1%; 0,1W	B51263-A9222-F
R65	1	1	39kOhm ±5%; 0,25W	B51263-A2393-J
R67	1	1	2,2kOhm ±5%; 0,25W	B51263-A2222-J
R68	1	1	100 Ohm ±5%; 0,33W	B54413-A2101-J
R52	1	1	Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR 100 Ohm ±20%; 1W; lin	W40955-A8101-M001
	1	1	Staubschutzkappe PROTECTION CAP	C44408-Z3-C3
C26,37	2	2	MKL-Kondensator MKL-CAPACITOR 2,2/uF ±20%; 63V	B32110-E9225-M
C27	1	1	Keramik-Kondensator CERAMIC CAPACITOR 6pF ±0,5pF; 500V	B38222-A5060-D
C28,32	2	2	MKL-Kondensator MKL-CAPACITOR 4,7/uF ±20%; 63V	B32110-E9475-M
C29	1	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 68/uF ±20%; 15V	B45170-A2686-M
C30	1	1	Keramik-Kondensator CERAMIC CAPACITOR 33pF ±5%; 500V	B38215-J5330-J
C31,39	2	2	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 68/uF ±20%; 20V	B45170-A3686-M
C33	1	1	10/uF ±20%; 10V	B45170-A1106-M
C36	1	1	150/uF ±20%; 15V	B45170-A2157-M
C38	1	1	Keramik-Kondensator CERAMIC CAPACITOR 30pF ±5%; 500V	B38215-J5300-J
C40	1	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 100/uF ±20%; 15V	B45170-A2107-M
C41	1	1	Lufttrimmer AIR-DIELECTRIC TRIMMER 2,5...11pF	Rel ko 131f
C,D	2	2	S-G-Relais DRY-REED RELAY Rel rls 24a	Rel Bv 662 E 56
			Transistor TRANSISTOR	
Ts3	1	1	2 N 2219	Q62702-S0003
Ts4 ..8	5	5	2 N 2218	Q62702-S0002
	6	6	Halterung MOUNTING	C42121-A11-C6
Gr2,4	2	2	Diode DIODE AA 118	Q60101-X118
	6	6	Isolierperle BEAD	C42187-Z7-C2

Relaisplatte S45035-D637-A101, A401
RELAY- BOARD

für Ausfg.
FOR MODEL
A101-A401

			Schichtwiderstand LAYER-TYPE RESISTOR	
R69	1		220 Ohm ±1%; 0,33W	B54413-A9221-F
R72		1	100 Ohm ±1%; 0,33W	B54413-A9101-F
R73	1		180 Ohm ±1%; 0,33W	B54413-A9181-F
R73		1	120 Ohm ±1%; 0,33W	B54413-A9121-F
R76,77	2		30 Ohm ±1%; 0,33W	B54413-A9300-F
R76,77		2	100 Ohm ±1%; 0,33W	B54413-A9101-F
R70	1		100 Ohm ±20%; 1W; lin	W40955-D8101-M001
R74,76	2	2	100 Ohm ±20%; 1W; lin	W40955-D8101-M001
			Keramik-Kondensator CERAMIC CAPACITOR	
C42	1		150pF ±5%; 500V	B38227-J5151-J x)
C42		1	22pF ±5%; 500V	B38226-J5220-J x)
C43	1		1000pF +30-20%; 500V	B37638-B5102-R000
C43		1	150pF ±5%; 500V	B38227-J5151-J x)
C44		1	39pF ±2%; 500V	B38226-J5390-G x)

x) = Wert wie eingebaut
VALUE AS MOUNTED

E	1	1	S-G-Relais DRY-REED RELAY Rel rls 24a	Rel Bv 662 E 56
		2	Isolierperle BEAD	C42187-Z7-C2

Pl.1 Hauptmodulator S45035-D642-A701
MAIN MODULATOR

			Schichtwiderstand LAYER-TYPE RESISTOR	
R1		1	1kOhm ±1%; 0,33W	B54413-A9102-F
R2		1	12kOhm ±1%; 0,1W	B51263-A9123-F

R3	1	2kOhm ±1%; 0,1W	B51263-A9202-F
R4,5	2	4kOhm ±1%; 0,1W	B51263-A9402-F
R6,22 R23,27	4	10kOhm ±5%; 0,25W	B51263-A2103-J
R7	1	2,2kOhm ±5%; 0,25W	B51263-A2222-J
R8,9,12,14 R21,26,30	7	220 Ohm ±5%; 0,33W	B54413-A2221-J
R10,11	2	47 Ohm ±5%; 0,33W	B54413-A2470-J
R13	1	27 Ohm ±5%; 0,33W	B54413-A2270-J
R15	1	1kOhm ±5%; 0,33W	B54413-A2102-J
R17,18	2	1,4kOhm ±1%; 0,1W	B51263-A9142-F
R19,20	2	1,5kOhm ±1%; 0,1W	B51263-A9152-F
R24	1	330 Ohm ±5%; 0,33W	B54413-A2331-J
R25	1	900 Ohm ±5%; 0,33W	B54413-A2901-J
R28	1	2,7kOhm ±5%; 0,25W	B51263-A2272-J
R29	1	39 Ohm ±5%; 0,33W	B54413-A2390-J
R16	1	Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR 200 Ohm ±20%; 1W; lin	W40955-D8201-M001
		Übertrager TRANSFORMER	
Ü1	1	Rel sp 75n	Rel Bv 622 T 3075
Ü2	1	9 Rel sp 6h	Rel Bv 622 P 3420
		Spule COIL	
L1,5	2	Rel sp 75p	Rel Bv 622 T 3062
L2	1	Rel sp 75p	Rel Bv 622 T 3063
L3	1	Rel sp 75p	Rel Bv 622 T 3064
L4	1	Rel sp 75p	Rel Bv 622 T 3065
		Kf-Kondensator STYROFLEX CAPACITOR	
C1,8	2	78pF ±1pF; 500V	B31141-A5780-F
C2	1	81pF ±1pF; 500V	B31141-A5810-F
C3	1	59pF ±1pF; 500V	B31141-A5590-F
C4	1	110pF ±1%; 500V	B31141-A5111-F
C5;	1	135pF ± 1%; 500V	B31141-A5131-F500
C6	1	Keramik-Kondensator CERAMIC CAPACITOR 15,6pF ±2,5%; 500V; N150	B38222-J5150-H600
C7	1	Kf-Kondensator STYROFLEX CAPACITOR 106pF ±1%; 500V	B31141-A5101-F600
C9,11 C13	3	MKL-Kondensator MKL-CAPACITOR 4,7/uF ±20%; 25V	B32110-C3475-M
C10	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 10/uF ±20%; 20V	B45170-A3106-M
C12	1	10/uF ±20%; 15V	B45170-A2106-M
C14	1	Kf-Kondensator STYROFLEX CAPACITOR 100pF ±1%; 500V Wert wie eingebaut VALUE AS MOUNTED	B31141-A5101-F
		MKL-Kondensator MKL-CAPACITOR	
C16,18	2	0,15/uF ±20%; 63V	B32110-E9154-M
C17	1	0,33/uF ±20%; 63V	B32110-E9334-M
C19,21 C22,23	4	0,1/uF ±20%; 100V	B32110-D0104-M
C20	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 6,8/uF ±20%; 35V	B45170-A4685-M
C15	1	Lufttrimmer AIR-DIELECTRIC TRIMMER 2,5...11pF	Rel ko 131f
		Transistor TRANSISTOR	
Ts1,2,4	3	BCY 58 / VII	Q60203-Y58-G
Ts3	1	BCY 58 / VIII	Q60203-Y58-H
	4	Halterung MOUNTING	C42121-A11-C10
Md1	1	Diodenquartett DIODE QUARTET 4x0A90 rauscharm 4x0A90 LOW NOISE	V42292-E4-A3
Gr1,2	2	Diode DIODE OA 90	Rel TL 672 R 108
Gr3	1	Zenerdiode ZENER DIODE Z7	Q62702-Z339-F4
	1	Halterung MOUNTING	C42121-A9-A1

Pl.2 Eichoszillator S45035-D641-B101, B401
CALIBRATING OSCILLATOR

für Ausfg. FOR MODEL -B101-B401			
	1	Formdraht, Brücke A WIRING-LINK A	S45035-D641-T2
	1	Formdraht, Brücke B WIRING-LINK B	S45035-D641-T1
		Schichtwiderstand LAYER-TYPE RESISTOR	
R15,25	2 2	220 Ohm ±5%; 0,33W	B54413-A2221-J
R16	1 1	11kOhm ±5%; 0,25W	B51263-A2113-J
R17	1 1	2kOhm ±5%; 0,25W	B51263-A2202-J
R18	1 1	470 Ohm ±5%; 0,33W	B54413-A2471-J
R19	1 1	10 Ohm ±5%; 0,33W	B54413-A2100-J
R23	1 1	10kOhm ±5%; 0,25W	B51263-A2103-J
R24	1 1	9,1kOhm ±5%; 0,25W	B51263-A2912-J
R26	1 1	1,2kOhm ±5%; 0,25W	B51263-A2122-J
R28	1 1	672 Ohm ±1%; 0,33W	B54413-A9671-F200
R29	1 1	2,1kOhm ±1%; 0,1W	B51263-A9212-F
R31	1 1	20 Ohm ±1%; 0,15W	B51264-A9200-F
R32	1 1	43,25 Ohm ±0,2%; 0,15W	B51264-A9430-C250
R33	1 1	167,2 Ohm ±0,5%; 0,15W	B51264-A9161-D720
R34	1 1	20 Ohm ±0,2%; 0,15W	B51264-A9200-C
R20	1 1	Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR 2kOhm ±20%; 1W; lin	W40955-A8202-M001
	1 1	Staubschutzkappe PROTECTION CAP	C44408-Z3-C3
Ü1	1 1	Übertrager TRANSFORMER	Rel Bv 622 T 3133
C7	1 1	MKL-Kondensator MKL-CAPACITOR 0,33/uF ±2P%; 63V	B32110-E9334-M
C9	1 1	Kf-Kondensator STYROFLEX CAPACITOR 2500pF ±1%; 125V	B31141-A1252-F
		MKL-Kondensator MKL-CAPACITOR	
C11,14	2 2	0,15/uF ±20%; 63V	B32110-E9154-M
C12	1 1	0,68/uF ±20%; 63V	B32110-E9684-M
C13	1 1	Keramik-Kondensator CERAMIC CAPACITOR 22pF ±5%; 500V	B38222-J5220-J
Ts3,4	2 2	Transistor TRANSISTOR BCY 58 / VIII	Q60203-Y58-H
	2 2	Halterung MOUNTING	C42121-A11-C10
	4 4	Isolierperle BEAD	C42187-Z7-C2
		Diode DIODE	
Gr3	1 1	BAY 41	Q60201-Y41
Gr4	1 1	Z7	Q62702-Z339-F4
	1 1	Halterung f. Gr4 MOUNTING FOR Gr4	C42121-A11-C7

Pl.3 Umsetzer 2,4 MHz/100 kHz S45035-D643-A101, A401
CONVERTER 2,4 MHz/100 kHz

für Ausfg. FOR MODEL -A101-A401			
		Schichtwiderstand LAYER-TYPE RESISTOR	
R1	1 1	375 Ohm ±1%; 0,33W	B54413-A9371-F500
R2	1 1	5,1kOhm ±1%; 0,1W	B51263-A9512-F
R3	1 1	4,3kOhm ±1%; 0,1W	B51263-A9432-F
R4,30 R34	3 3	220 Ohm ±5%; 0,33W	B54413-A2221-J
R5	1 1	1,8kOhm ±5%; 0,25W	B51263-A2182-J
R6	1 1	330 Ohm ±5%; 0,33W	B54413-A2331-J

R7	1	1	270 Ohm ±5%; 0,33W	B54413-A2271-J
R8 ..11	4	4	1kOhm ±1%; 0,33W	B54413-A9102-F
R14	1	1	18kOhm ±5%; 0,25W	B51263-A2183-J
R15	1	1	5,6kOhm ±5%; 0,25W	B51263-A2562-J
R16	1	1	180 Ohm ±5%; 0,33W	B54413-A2181-J
R17	1	1	3,3kOhm ±5%; 0,25W	B51263-A2332-J
R18,26	2	2	1kOhm ±5%; 0,33W	B54413-A2102-J
R19	1	1	330 Ohm ±1%; 0,33W	B54413-A9331-F
R22	1	1	27kOhm ±5%; 0,25W	B51263-A2273-J
R23	1	1	6,8kOhm ±5%; 0,25W	B51263-A2682-J
R24	1	1	2,2kOhm ±5%; 0,25W	B51263-A2222-J
R25	1	1	100 Ohm ±5%; 0,33W	B54413-A2101-J
R27	1		1,8kOhm ±1%; 0,25W	B51263-A2182-F
R27		1	2kOhm ±1%; 0,25W	B51263-A2202-F
R31	1	1	10kOhm ±5%; 0,25W	B51263-A2103-J
R32	1	1	2,7kOhm ±5%; 0,25W	B51263-A2272-J
R33	1	1	47 Ohm ±5%; 0,33W	B54413-A2470-J
R35	1	1	75 Ohm ±5%; 0,33W	B54413-A2750-J
			Übertrager TRANSFORMER	
Ü1	1	1	9 Rel sp 5n	Rel Bv 622 N 3564
Ü2	1	1	9 Rel sp 5n	Rel Bv 622 N 3565
Ü3	1	1	9 Rel sp 75n	Rel Bv 622 T 3077
			Spule COIL	
L1,2	2	2	9 Rel sp 5n	Rel Bv 622 N 3562
L3	1	1	9 Rel sp 5n	Rel Bv 622 N 3563
C1	1	1	Kf-Kondensator STYROFLEX CAPACITOR 884pF ±1%; 500V	B31141-A5881-F400
C2,5	2	2	Keramik-Kondensator CERAMIC CAPACITOR 180pF ±1%; 500V; N033	B38240-J5181-F
C3	1	1	Kf-Kondensator STYROFLEX CAPACITOR 116pF ±1%; 500V	B31141-A5111-F600
C4	1	1	Kf-Kondensator PLASTIC-FOIL CAPACITOR 846pF ±1%; 500V	B31141-A5841-F600
C6	1	1	Keramik-Kondensator CERAMIC CAPACITOR 16,9pF ±2,5%; 500V; N150	B38222-J5160-H900
C7	1	1	132pF ±1%; 500V; N047	B38248-J5131-F200
C8,10,15 C17,18,21 C23,25,27	9	9	MKL-Kondensator MKL-CAPACITOR 0,15/uF ±20%; 63V	B32110-E9154-M
C9,14	2	2	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 10/uF ±20%; 20V	B45170-A3106-M
C13	1	1	Kf-Kondensator PLASTIC-FOIL CAPACITOR 4900pF ±1%; 125V	B31141-A1492-F
			Keramik-Kondensator CERAMIC CAPACITOR	
C16	1	1	330pF +30-20% 500V	B37635-B5331-R000
C22	1	1	15pF ±5%; 500V	B38222-A5150-J
C26	1	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 6,8/uF ±20%; 35V	B45170-A4685-M
Md2	1	1	Diodenquartett DIODE QUARTET 4 x OA 90 rauscharm/LOW NOISE	V42292-E4-A3
Ts1 ..5	5	5	Transistor TRANSISTOR BCY 58 / VIII	Q60203-Y58-H
	5	5	Halterung MOUNTING	C42121-A11-C10
	10	10	Isolierperle BEAD	C42187-Z7-C2

Pl.4 Quarzfilter I S45035-D644-A701
CRYSTAL FILTER I

			Schichtwiderstand LAYER-TYPE RESISTOR	
R1	1		590 Ohm ±1%; 0,33W	B54413-A9591-F
R4	1		10kOhm ±1%; 0,1W	B51263-A9103-F
R5	1		15kOhm ±1%; 0,1W	B51263-A9153-F
R6,7	2		390 Ohm ±5%; 0,33W	B54413-A2391-J
R8	1		1,8kOhm ±5%; 0,25W	B51263-A2182-J
R3	1		Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR 2kOhm ±20%; 1W; lin	W40955-A8202-M001
	1		Staubschutzkappe PROTECTION CAP	C44408-Z3-C3
			Übertrager TRANSFORMER	
Ü1	1		Rel sp 75n	Rel Bv 622 T 3070
Ü2	1		Rel sp 75n	Rel Bv 622
			Kf-Kondensator PLASTIC-FOIL CAPACITOR	
C1,8	2		2400pF ±1%; 125V	B31141-[illegible]242-F
C3,6	2		147pF ±1%; 500V	B31141-A5141-F700
C4	1		218pF ±1%; 500V	B31141-A5211-[illegible]8C0
C7	1		205pF ±1%; 500V	B31141-A5201-F500
C9,12	2		MKL-Kondensator MKL-CAPACITOR 0,15/uF ±20%; 63V	B32110-E91[illegible]4-M
C10	1		Keramik-Kondensator CERAMIC CAPACITOR 20pF ±5%; 500V	B38222-A5200-J
C11	1		Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 6,8/uF ±20%; 35V	B45170-A4685-M
C2,5	2		Lufttrimmer AIR-DIELECTRIC TRIMMER 2...31pF	Rel ko 130cb
Kr1,2	2		Filter-Quarz FILTER-CRYSTAL Q34; f_o = 99,985 kHz	Q83402-A9998-F500
	2		Quarzhalterung CRYSTAL-MOUNTING	C42121-A25-A2
Ts1	1		Transistor TRANSISTOR BCY 58 / VIII	Q60203-Y58-J
	1		Halterung MOUNTING	C42121-A11-C
	2		Isolierperle BEAD	C42187-Z7-C2

Pl.5 Quarzfilter II S45035-D645-A701
CRYSTAL FILTER II

			Schichtwiderstand LAYER-TYPE RESISTOR	
R1	1		590 Ohm ±1%; 0,33W	B54413-A959[illegible]-F
R2,6 R7	3		390 Ohm ±5%; 0,33W Wert wie eingebaut VALUE AS MOUNTED	B54413-A2391-J
R4	1		10kOhm ±1%; 0,1W	B51263-A9103-F
R5	1		9,1kOhm ±1%; 0,1W	B51263-A9912-F
R8	1		1,8kOhm ±5%; 0,25W	B51263-A21[illegible]2-J
R3	1		Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR 2kOhm ±20%; 1W; lin	W40955-A8202-M001
	1		Staubschutzkappe PROTECTION CAP	C44408-Z3-C3
			Übertrager TRANSFORMER	
Ü1	1		Rel sp 75n	Rel Bv 622 T 3071
Ü2	1		Rel sp 75n	Rel Bv 622 T 3072
Ü3	1		Rel sp 75n	Rel Bv 622 T 3073
			Kf-Kondensator PLASTIC-FOIL CAPACITOR	
C1,9	2		567pF ±1%; 500V	B31141-A5561-F700
C3,5,8	3		58pF ±1pF; 500V	B31141-A5580-F
C6	1		130pF ±1%; 500V	
C10,13	2		MKL-Kondensator MKL-CAPACITOR 0,15/uF ±20%; 63V	B32110-E9154-[illegible]
C11	1		Keramik-Kondensator CERAMIC CAPACITOR 20pF ±5%; 500V	B38222-A5200-J
C12	1		Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 6,8/uF ±20%; 35V	B45170-A4685-M
C2,4,7	3		Lufttrimmer AIR-DIELECTRIC TRIMMER 2...31pF	Rel ko 130cb
Kr1,2 Kr3	3		Filter-Quarz FILTER-CRYSTAL Q34; f_o = 99,940 kHz	Q83402-A9994-F

	3	Quarzhalterung CRYSTAL-MOUNTING		C42121-A25-A2
Ts1	1	Transistor TRANSISTOR BCY 58 / IX		Q60203-Y58-J
	1	Halterung MOUNTING		C42121-A11-C10
	2	Isolierperle		C42187-Z7-C2

P1.6 100-kHz-Filter S45035-D646-B701
100-kHz-FILTER

Schichtwiderstand
LAYER-TYPE RESISTOR

R1	1	590 Ohm ±1%; 0,33W	B54413-A9591-F
R4	1	10kOhm ±1%; 0,1W	B51263-A9103-F
R5	1	7,5kOhm ±1%; 0,1W	B51263-A9752-F
R6,7	2	390 Ohm ±5%; 0,33W	B54413-A2391-J
R8	1	1,8kOhm ±5%; 0,25W	B51263-A2182-J
R3	1	Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR 2kOhm ±20%; 1W; lin	w40955-D8202-M001

Spule
COIL

L1	1	Rel sp 75n	V45231-C3016
L2	1	Rel sp 75n	V45231-C3017
L3	1	Rel sp 75n	V45231-C3018

Kf-Kondensator
PLASTIC-FOIL CAPACITOR

C1	1	4920pF ±1%; 125V	B31141-A1492-F200
C2	1	146pF ±1%; 500V	B31141-A5141-F600
C3	1	4798pF ±1%; 125V	B31141-A1472-F980
C4	1	122pF ±1pF; 500V	B31141-A5121-F200
C5	1	4944pF ±1%; 125V	B31141-A1492-F440
C6,9	2	MKL-Kondensator MKL-CAPACITOR 0,15/uF ±20%; 63V	B32110-E9154-M
C7	1	Keramik-Kondensator CERAMIC CAPACITOR 20pF ±5%; 500V	B38222-A5200-J
C8	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 6,8/uF ±20%; 35V	B45170-A4685-M
Ts1	1	Transistor TRANSISTOR BCY 58 / IX	Q60203-Y58-J
	1	Halterung MOUNTING	C42121-A11-C10
	2	Isolierperle BEAD	C42187-Z7-C2

P1.7 100-kHz-Verstärker S45035-D647-B101, B401
100-kHz-PREAMPLIFIER

für Ausfg. FOR MODEL				
		-B101-B401		
			Schichtwiderstand LAYER-TYPE RESISTOR	
R1	1	1	18kOhm ±5%; 0,25W	B51263-A2183-J
R2,3	2	2	3,9kOhm ±1%; 0,1W	B51263-A9392-F
R4,10,25	3	3	680 Ohm ±5%; 0,33W	B54413-A2681-J
R5	1		280 Ohm ±1%; 0,33W	B54413-A9281-F
R5		1	230 Ohm ±1%; 0,33W	B54413-A9231-F
R6	1	1	27kOhm ±5%; 0,25W	B51263-A2273-J
R7,22	2	2	6,8kOhm ±5%; 0,25W	B51263-A2682-J
R8,23	2	2	2,2kOhm ±5%; 0,25W	B51263-A2222-J
R9,24	2	2	82 Ohm ±5%; 0,33W	B54413-A2820-J
R11	1	1	1,8kOhm ±1%; 0,1W	B51263-A9182-F
R12,15	2	2	270 Ohm ±5%; 0,33W	B54413-A2271-J
R13	1		658,7 Ohm ±0,2%; 0,15W	B51264-A9651-C870
R13		1	274,2 Ohm ±0,2%; 0,15W	B51264-A9271-C420
R14	1		224 Ohm ±0,2%; 0,15W	B51264-A9221-C400
R14		1	104,7 Ohm ±0,2%; 0,15W	B51264-A9101-C470
R16	1	1	27kOhm ±1%; 0,1W	B51263-A9273-F
R17	1	1	6,8kOhm ±1%; 0,1W	B51263-A9682-F
R18	1	1	3,3kOhm ±5%; 0,25W	B51263-A2332-J
R19	1	1	560 Ohm ±5%; 0,33W	B54413-A2561-J
R20	1	1	180 Ohm ±1%; 0,33W	B54413-A9181-F
R21	1	1	22kOhm ±5%; 0,25W	B51263-A2223-J
R26	1		2,5kOhm ±1%; 0,1W	B51263-A9252-F
R26		1	2,2kOhm ±1%; 0,1W	B51263-A9222-F
R27	1		923 Ohm ±0,2%; 0,15W	B51264-A9921-C300
R27		1	1614 Ohm ±0,2%; 0,15W	B51264-A9162-C140
R28	1	1	30 Ohm ±0,2%; 0,15W	B51264-A9300-C
R29	1	1	27 Ohm ±5%; 0,33W	B54413-A2270-J
R30	1	1	570 Ohm ±1%; 0,33W	B54413-A9571-F
R31	1		100 Ohm ±0,2%; 0,15W	B51264-A9101-C
R31		1	60 Ohm ±0,2%; 0,15W	B51264-A9600-C
R32	1	1	Thernewid THERM. RESISTOR 20 Ohm ±10%; 2580°K	Q63011-K200-K

Spule
COIL

L1	1	1	Rel sp 75n	V45231-C3016
L2	1	1	Rel sp 75n	V45231-C3017
L3	1	1	Rel sp 75n	V45231-C3018

MKL-Kondensator
MKL-CAPACITOR

C1,4,5 C6,8,10 C11,12	8	8	0,1/uF ±20%; 100V	B32110-D0104-M
C2,7,13 C14	4	4	1/uF ±20%; 63V	B32110-E9105-M
C3,9	2	2	Keramik-Kondensator CERAMIC CAPACITOR 270pF +30-20%; 500V	B37635-B5271-R000
C15	1	1	Kf-Kondensator PLASTIC-FOIL CAPACITOR 4920pF ±1%; 125V	B31141-A1492-F200
C16	1	1	146pF ±1%; 500V	B31141-A5141-F600
C17	1	1	4798pF ±1%; 125V	B31141-A1472-F980
C18	1	1	122pF ±1pF; 500V	B31141-A5121-F200
C19	1	1	4944pF ±1%; 125V	B31141-A1492-F440
H,J, K	3	3	S-G-Relais DRY-REED RELAY Rel rls 24a	Rel Bv 662 E 56
Gr1,2 Gr3	3	3	Diode DIODE AA 118	Q60101-X118
Ts1. ..6	6	6	Transistor TRANSISTOR BCY 58 / VIII	Q60203-Y58-H
	6	6	Halterung MOUNTING	C42121-A11-C10
	4	4	Isolierperle BEAD	C42187-Z7-C2

P1.8 Breitbandverstärker S45035-D648-B701
WIDEBAND AMPLIFIER

Schichtwiderstand
LAYER-TYPE RESISTOR

R1	1	25kOhm ±1%; 0,1W	B51263-A9253-F
R2	1	6,2kOhm ±1%; 0,1W	B51263-A9622-F
R3	1	2,2kOhm ±5%; 0,25W	B51263-A2222-J
R4,12	2	1kOhm ±5%; 0,33W	B54413-A2102-J
R5,20	2	200 Ohm ±1%; 0,33W	B54413-A9201-F
R6,22	2	270 Ohm ±5%; 0,33W	B54413-A2271-J
R7,8	2	220 Ohm ±5%; 0,33W	B54413-A2221-J
R9,18	2	3,3kOhm ±5%; 0,25W	B51263-A2332-J
R10	1	15kOhm ±5%; 0,25W	B51263-A2153-J
R11,23	2	2,7kOhm ±5%; 0,25W	B51263-A2272-J
R13	1	56 Ohm ±5%; 0,33W	B54413-A2560-J
R14	1	200 Ohm ±5%; 0,33W	B54413-A2201-J
R15,27	2	4kOhm ±1%; 0,1W	B51263-A9402-F
R16	1	120 Ohm ±5%; 0,33W	B54413-A2121-J
R17,24	2	18kOhm ±5%; 0,25W	B51263-A2183-J
R19	1	1,2kOhm ±5%; 0,25W	B51263-A2122-J
R21	1	100 Ohm ±5%; 0,33W	B54413-A2101-J
R25	1	1,6kOhm ±5%; 0,25W	B51263-A2162-J
R26	1	43 Ohm ±5%; 0,33W	B54413-A2430-J

R28,29	2	2,5kOhm ±1%; 0,1W	B51263-A9252-F
R34	1	3,3kOhm ±1%; 0,1W	B51263-A9332-F
R36	1	8,2kOhm ±1%; 0,1W	B51263-A9822-F
R37	1	1,2kOhm ±1%; 0,1W	B51263-A9122-F
R35	1	Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR 2kOhm ±20%; 1W; lin	W40955-A8202-M001
	1	Staubschutzkappe PROTECTION CAP	C44408-Z3-C3
L1	1	Spule COIL Rel sp 74i	Rel Bv 622 S 3388
C1,9	2	MKL-Kondensator MKL-CAPACITOR 6,8/uF ±20%; 63V	B32110-E9685-M
C2	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 47/uF ±20%; 20V	B45170-A3476-M
C3	1	Keramik-Kondensator CERAMIC CAPACITOR 27pF ±2,5%; 500V	B38222-A5270-H
		Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR	
C4	1	47/uF ±20&; 10V	B45170-A1476-M
C5	1	10/uF ±20%; 20V	B45170-A3106-M
C6,11	2	68/uF ±20%; 20V	B45170-A3686-M
C7	1	100/uF ±20%; 10V	B45170-A1107-M
C10	1	Keramik-Kondensator CERAMIC CAPACITOR 8pF ±0,5pF; 500V	B38222-A5080-D
C12	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 15/uF ±20%; 20V	B45170-A3156-M
C14,15	2	MKL-Kondensator MKL-CAPACITOR 4,7/uF ±20%; 63V	B32110-E9475-M
		Keramik-Kondensator CERAMIC CAPACITOR	
C16	1	30pF ±5%; 500V Wert wie eingebaut VALUE AS MOUNTED	B38222-A5300-J
C18	1	6pF ±0,5pF; 500V	B38222-A5060-D
C19	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 47/uF ±20%; 15V	B45170-A2476-M
		Lufttrimmer AIR-DIELECTRIC TRIMMER	
C8,13	2	2,3...5pF	Rel ko 131e
C17	1	2,5...11pF	Rel ko s31f
L	1	S-G-Relais DRY-REED RELAY Rel rls 24a	Rel Bv 662 E 56
Gr1,2	2	Diode DIODE OA 90	Rel TL 672 R 108
Ts1...7	7	Transistor TRANSISTOR BCY 58 / VIII	Q60203-Y58-H
	7	Halterung MOUNTING	C42121-A11-C10
	6	Isolierperle BEAD	C42187-Z7-C2

Pl.9 Leistungsverstärker und Demodulator S45035-D649-A701
POWER AMPLIFIER AND DEMODULATOR

		Schichtwiderstand LAYER-TYPE RESISTOR	
R1,4	2	6,2kOhm ±5%; 0,25W	B51263-A2622-J
R2	1	9,1kOhm ±5%; 0,25W	B51263-A2912-J
R3	1	120 Ohm ±5%; 0,33W	B54413-A2121-J
R5	1	1kOhm ±5%; 0,33W	B54413-A2102-J
R6	1	82 Ohm ±5%; 0,33W	B54413-A2820-J
R7	1	15 Ohm ±5%; 0,33W	B54413-A2150-J
R8	1	51 Ohm ±5%; 0,33W	B54413-A2510-J
R9	1	390 Ohm ±5%; 0,33W	B54413-A2391-J
R10	1	73 Ohm ±1%; 0,33W	B54413-A9730-F
R11	1	3,9kOhm ±5%; 0,25W	B51263-A2392-J
R12	1	43kOhm ±1%; 0,1W	B51263-A9433-F
R14	1	10kOhm ±1%; 0,1W	B51263-A9103-F
R16	1	91kOhm ±1%; 0,1W	B51263-A9913-F
R17	1	38kOhm ±1%; 0,1W	B51263-A9383-F
R13,15	2	Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR 10kOhm ±20%; 1W; lin	W40955-A8103-M001
	2	Staubschutzkappe PROTECTION CAP	C44408-Z3-C3
C1	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 47/uF ±20%; 20V	B45170-J3476-M
C2,4	2	68/uF ±20%; 20V	B45170-J3686-M
C3	1	Keramik-Kondensator CERAMIC CAPACITOR 10pF ±1pF; 500V	B38222-A5100-F
C5	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 150/uF ±20%; 15V	B45170-J2157-M
C6	1	MKH-Kondensator MKH-CAPACITOR 0,047/uF ±20%; 250V	B32220-K3473-M
Ts1,2	2	Transistor TRANSISTOR 2 N 2218	Q62702-S0002
	2	Halterung MOUNTING	C42121-A11-C6
	2	Kühlschelle COOLER-SLEEVE	C42121-Z21-C2
Gr1,2	2	Diode DIODE AA 118	Q60101-X118
	2	Isolierperle BEAD	C42187-Z7-C2

Netzteil I S45035-D650-A701
POWER SUPPLY UNIT I

	1	Netzeingang MAINS INPUT	S45035-D652-A701
		Schichtwiderstand LAYER-TYPE RESISTOR	
R2	1	400 Ohm ±5%; 0,33W	B54413-A2401-J
R3	1	2,5kOhm ±1%; 0,1W	B51263-A9252-F
R4	1	27,5kOhm ±1%; 0,1W	B51263-A9273-F500
C1...4	4	Elko ELECTROLYTIC CAPACITOR 250/uF +50-20%; 70V	B41611-B8257-S
T1	1	Drucktastenschalter PUSHBUTTON SWITCH	C44315-Z2-C1
Gr1	1	Silizium-Kleingleichrichter-satz SILICON RECTIFIER SETUP B40 C2C00	V23212-C1406
Ts1	1	Transistor TRANSISTOR 2 N 3054	Q62702-U7
B5,6	2	Buchseneinheit JACK ASSEMBLY C42334-A175-A20	V42255-B7-B15
Bu7	1	Gerätebuchse COAX JACK 1,6/5,6	C42334-A76-A14
Bu8	1	Gerätebuchse JACK	C42334-Z3-C79
	1	Behälter für Ersatzteile CONTAINER FOR SPARES	C44165-A11-C2
	1	Lampenfassung LAMP-HOLDER	C42230-A3-A1
SL1	1	Signallampe SIGNAL LAMP 24V/0,6W	Fg lp 62be

Netzeingang S45035-D652-A701
MAINS INPUT

Tr1	1	Netztransformator POWER TRANSFORMATOR Zub tr MD 65c	Rel Bv 621 G 3125
		Wicklg.I (AI, EI) 824 Windg. 0,24 CuL; 38 Ohm	
		Wicklg.II (AII, EII) 824 Windg. 0,24 CuL; 42 Ohm	
		Wicklg. III (AIII, EIII/2c,3c) 260 Windg. 0,50 CuL; 3,6 Ohm	
S8	1	Netzeinbaustecker mit Spannungswähler POWER SOCKET WITH VOLTAGE ADJUSTER C44334-A11-A1	Rel Bv 654 A 3002
	1	G-Sicherungshalter FUSE HOLDER	C42327-Z13-C1
	1	G-Schraubkappe FUSE CAP	C42327-Z12-C2

P1.10 Netzteil II S45035-D651-A701
POWER SUPPLY UNIT II

		Schichtwiderstand LAYER-TYPE RESISTOR	
R1,2,8	3	1,8kOhm ±5%; 0,25W	B51263-A2182-J
R3	1	100kOhm ±5%; 0,25W	B51263-A2104-J
R4,10,16	3	2,7kOhm ±5%; 0,25W	B51263-A2272-J
R6,13	2	1,2kOhm ±5%; 0,25W	B51263-A2122-J
R7	1	820 Ohm ±5%; 0,33W	B54413-A2821-J
R9	1	3,3kOhm ±5%; 0,25W	B51263-A2332-J
R12	1	1,6kOhm ±5%; 0,25W	B51263-A2162-J
R14	1	430 Ohm ±5%; 0,33W	B54413-A2431-J
R5,11 R15	3	Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR 1kOhm ±20%; 1W; lin	W50955-A8102-M001
	3	Staubschutzkappe PROTECTION CAP	C44408-Z3-C3
C1,3 C6	3	Keramik-Kondensator CERAMIC CAPACITOR 1000pF +50-20%; 500V	B37623-B5102-S
	6	Isolierperle BEAD	C42187-Z7-C2
		Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR	
C2,4	2	47/uF ±20%; 20V	B45170-A3476-M
C5,7	2	68/uF ±20%; 20V	B45170-A3686-M
Gr2,3 Gr4	3	Zenerdiode ZENER DIODE Z7	Q62702-Z339-F4
	3	Halterung MOUNTING	C42121-A9-A1
C2,3 C5,6 C8	5	Transistor TRANSISTOR 2 N 3053	Q62702-L15
	5	Halterung MOUNTING	C42121-A11-C6
	2	Kühlschelle für Ts2,3 COOLER-SLEEVE FOR Ts2,3	C42121-Z21-C2
Ts4,7	2	Transistor TRANSISTOR 2 N 3054	Q62702-U7

Oszillator I 0...1600 kHz S45034-D369-A702
OSCILLATOR I 0...1600 kHz

Verwendung: Pegelmesser S45034-D354-B302, B602
USED IN: LEVEL METER S45034-D354-B302, B602

Symbol SYMBOL	Stck QTY	Gegenstand DESCRIPTION	Bestellangabe ORDERING DATA	Seite PAGE
Pl.1	1	Rasteroszillator-Platte 1 SPECTRUM OSCILLATOR BOARD 1	S45035-W667-A701	
Pl.2	1	Rasteroszillator-Platte 2 SPECTRUM OSCILLATOR BOARD 2	S45035-W668-A701	
Pl.3	1	Rasteroszillator-Platte 3 SPECTRUM OSCILLATOR BOARD 3	S45035-D623-A701	
	1	Verdrahtungsleiterplatte PRINTED CIRCUIT BOARD	S45035-W670-A701	
R1,2	2	Schichtwiderstand LAYER-TYPE RESISTOR 75 Ohm ±1%; 0,33W	B54413-A9750-F	
C1	1	Lufttrimmer AIR-DIELECTRIC TRIMMER 1,3...5pF	Rel ko 131ac	
C3	1	Keramik-Kondensator CERAMIC CAPACITOR 2pF ±0,25pF; 500V	B38212-A5020-C	
K1	1	Drehko VAR. CAPACITOR 17U/10 pF C001 ZZ195 (Fa.Valvo)	Rel TL 632 B 3002a2	
Sz1	1	Allsichtschauzeichen INDICATOR h'grün/orange br'green/orange	V45282-Z3009-A1	
S6	1	Kleindrehschalter MIDGET ROTARY SWITCH	C40315-M303-N1	
	1	Kurbel-Drehknopf ROTARY KNOB FOR CRANK 37 ø	C44106-A20-A2	
	1	Drehknopf ROTARY KNOB	C44106-A20-A3	
	1	Knebelgriff KNOB	Rel antr 93c	
Bu9	1	Gerätebuchse gerade COAX JACK 1,6/5,6 Schaltbuchse SWITCHING JACK	C42334-A76-A14	
BuA	1	1,6/5,6 (2u)	C42334-A76-A36	
BuB	1	1,6/5,6 (1a,1r)	C42334-A76-A34	
	1	Filmskalenantrieb FILM-SCALE DRIVE 1m grob/fein 1m COARSE/FINE	C44106-A7-A4	
	1	Membrankupplung MEMBRANE DRIVE COUPLING	C44106-A5-A61	

Pl.1 Rasteroszillator-Platte 1 S45035-W667-A701
SPECTRUM OSCILLATOR BOARD 1

		Schichtwiderstand LAYER-TYPE RESISTOR	
R1	1	56kOhm ±5%; 0,25W	B51263-A2563-J
R2	1	18kOhm ±1%; 0,1W	B51263-A9183-F
R3	1	6,8kOhm ±1%; 0,1W	B51263-A9682-F
R4,29 R37	3	47 Ohm ±5%; 0,33W	B54413-A2470-J
R5,19 R28,36	4	1kOhm ±1%; 0,33W	B54413-A9102-F
R6	1	150 Ohm ±5%; 0,33W	B54413-A2151-J
R7	1	2,5kOhm ±1%; 0,1W	B51263-A9252-F
R8,9 R13	3	30kOhm ±1%; 0,1W	B51263-A9303-F
R10	1	47kOhm ±1%; 0,1W	B51263-A9473-F
R11	1	22kOhm ±1%; 0,1W	B51263-A9223-F
R12	1	47kOhm ±5%; 0,25W	B51263-A2473-J
R14	1	18kOhm ±5%; 0,25W	B51263-A2183-J
R15,22	2	15kOhm ±5%; 0,25W	B51263-A2153-J
R16,18 R24	3	100 Ohm ±5%; 0,33W	B54413-A2101-J
R17	1	285 Ohm ±1%; 0,33W	B54413-A9281-F500
R20	1	200 Ohm ±5%; 0,33W	B54413-A2201-J
R21	1	1kOhm ±5%; 0,33W	B54413-A2102-J
R23	1	22kOhm ±5%; 0,25W	B51263-A2223-J
R25	1	2,2kOhm ±5%; 0,25W	B51263-A2222-J
R26,34	2	15kOhm ±5%; 0,25W	B51263-A2153-J
R27,35	2	3kOhm ±5%; 0,25W	B51263-A2302-J
R30,38	2	180 Ohm ±1%; 0,33W	B54413-A9181-F
R31	1	68 Ohm ±5%; 0,33W	B54413-A2680-J
R32,39	2	300 Ohm ±1%; 0,33W	B54413-A9301-F
R33,40	2	1,2kOhm ±5%; 0,25W	B51263-A2122-J
R41,43	2	200 Ohm ±5%; 0,33W	B54413-A2201-J
R42	1	910 Ohm ±5%; 0,33W	B54413-A2911-J
Ü1,2	2	Übertrager TRANSFORMER Rel sp 821	Rel Bv 622 W 3040
L1	1	Spulentopf COIL-CAN C44330-A3-A1	Rel Bv 623 G 3062
C1..4 C11,13, C14..17 C20,22	12	MKH-Kondensator MKH-CAPACITOR 0,01 µF ±20%; 250V Keramik-Kondensator CERAMIC CAPACITOR	B32220-K3103-M
C5	1	7pF ±0,5pF; 500V Wert wie eingebaut VALUE AS MOUNTED	B38226-J5070-D
C7	1	15pF ±5%; 500V Kf-Kondensator PLASTIC-FOIL CAPACITOR	B38226-J5150-J
C8	1	150pF ±2,5%; 500V	B31141-A5151-H
C9	1	1000pF ±2,5%; 500V	B31141-A5102-H
C12	1	MKL-Kondensator MKL-CAPACITOR 0,15 µF ±20%; 63V	B32110-E9154-M
C18	1	MKH-Kondensator MKH-CAPACITOR 0,022 µF ±20%; 250V	B32220-K3223-M
C19,21	2	Kf-Kondensator PLASTIC-FOIL CAPACITOR 100pF ±5%; 500V	B31141-A5101-J
C6	1	Lufttrimmer AIR-DIELECTRIC TRIMMER 1,7...19pF	Rel ko 130ca
Gr1,2	2	Germaniumdiode GERMANIUM-DIODE OA 90	Rel TL 672 R 108
Gr3	1	Varaktordiode VARACTOR-DIODE HC 7004B 70pF ±5%; bei/AT -4V/25°C	Rel TL 672 R129 a10
Gr4	1	Zenerdiode ZENER DIODE Z7	Q62702-Z339-F4
	1	Halterung MOUNTING	C42121-A9-A1
Ts1 ..9	9	Transistor TRANSISTOR BCY 58 / VIII	Q60203-Y58-H
	9	Halterung MOUNTING	C42121-A11-C10

Pl.2 Rasteroszillator-Platte 2 S45035-W668-A701
SPECTRUM OSCILLATOR BOARD 2

		Schichtwiderstand LAYER-TYPE RESISTOR	
R1,2	2	2,2kOhm ±5%; 0,25W	B51263-A2222-J
R3	1	300 Ohm ±1%; 0,33W	B54413-A9301-F
R4	1	600 Ohm ±1%; 0,33W	B54413-A9601-F
R5,6,33	3	220 Ohm ±5%; 0,33W	B54413-A2221-J
R7	1	12kOhm ±5%; 0,25W	B51263-A2123-J
R8	1	16kOhm ±5%; 0,25W	B51263-A2163-J
R9	1	2,4kOhm ±5%; 0,25W	B51263-A2242-J
R10	1	1,8kOhm ±5%; 0,25W	B51263-A2182-J
R11	1	200 Ohm ±1%; 0,33W	B54413-A9201-F
R12	1	30kOhm ±5%; 0,25W	B51263-A2303-J
R14	1	3,9kOhm ±1%; 0,1W	B51263-A9392-F
R15,38	2	8,2kOhm ±5%; 0,25W	B51263-A2822-J
R16,34	2	1,2kOhm ±5%; 0,25W	B51263-A2122-J
R17	1	270 Ohm ±5%; 0,33W	B54413-A2271-J

R18	1	150 Ohm ±5%; 0,33W	B54413-A2151-J
R19	1	47kOhm ±5%; 0,25W	B51263-A2473-J
R20,21	2	3,9kOhm ±1%; 0,1W	B51263-A9392-F
R22,26	2	2kOhm ±1%; 0,1W	B51263-A9202-F
R23	1	22kOhm ±1%; 0,1W	B51263-A9223-F
R25,32	2	5,6kOhm ±1%; 0,1W	B51263-A9562-F
R27	1	360 Ohm ±1%; 0,33W	B54413-A9361-F
R28	1	3kOhm ±1%; 0,1W	B51263-A9302-F
R29	1	1kOhm ±1%; 0,33W	B54413-A9102-F
R30	1	30kOhm ±1%; 0,1W	B51263-A9303-F
R35	1	4,7kOhm ±5%; 0,25W	B51263-A2472-J
R36	1	470 Ohm ±5%; 0,33W	B54413-A2471-J
R37	1	56kOhm ±5%; 0,25W	B51263-A2563-J
R39	1	330 Ohm ±5%; 0,33W	B54413-A2331-J
R13	1	Schichtdrehwiderstand LAYER-TYPE VAR RESISTOR 5kOhm ±20%; 1W; lin	W40955-A8502-M001
	1	Staubschutzkappe PROTECTION CAP	C44408-Z3-C3
R24,31	2	Thernewid THERM. RESISTOR K11c / 3000°K	Q63011-K501-K
		Übertrager TRANSFORMER	
Ü1	1	C42035-A10-A3	V45231-C3137
Ü2	1	C42035-A10-A3	V45231-C3138
		Spule COIL	
L1	1	Rel sp 82i	Rel Bv 622 W 3041
L2	1	Rel sp 82i	Rel Bv 622 W 3042
C1,2,7	3	MKH-Kondensator MKH-CAPACITOR 0,022/uF ±20%; 250V	B32220-E9154-M
C3,5,6 C10,20	5	MKL-Kondensator MKL-CAPACITOR 0,15/uF ±20%; 63V	B32110-E9154-M
C4	1	Kf-Kondensator PLASTIC-FOIL CAPACITOR 600pF ±5%; 500V	B31141-A5601-J
		MKL-Kondensator MKL-CAPACITOR	
C8, C16..19	5	1,5/uF ±20%; 63V	B32110-E9155-M
C9	1	0,68/uF ±20%; 63V	B32110-E9684-M
		Kf-Kondensator PLASTIC-FOIL CAPACITOR	
C11	1	2000pF ±5%; 125V	B31141-A1202-J
C12	1	4240pF ±1%; 125V	B31142-A1422-F400
C13	1	1190pF ±1%; 125V	B31141-A1112-F900
C14	1	9540pF ±1%; 125V	B31142-A1952-F400
C15	1	5300pF ±1%; 125V	B31142-A1532-F
C21	1	MKL-Kondensator MKL-CAPACITOR 0,47/uF ±20%; 63V	B32110-E9474-M
		Germaniumdiode GERMANIUM DIODE	
Gr1,2	2	OA 159	Q62701-A49-F2
Gr3,4	2	OA 90	Rel TL 672 R 108
Ts1 ..9	9	Transistor TRANSISTOR BCY 58 / VIII	Q60203-Y58-H
	9	Halterung MOUNTING	C42121-A11-C10

Pl.3 Rasteroszillator-Platte 3 S45035-D623-A701
SPECTRUM OSCILLATOR BOARD 3

		Schichtwiderstand LAYER-TYPE RESISTOR	
R1	1	300 Ohm ±5%; 0,33W	B54413-A2301-J
R2,12	2	15kOhm ±5%; 0,25W	B51263-A2153-J
R3,6	2	4,7kOhm ±5%; 0,25W	B51263-A2472-J
R4	1	10 Ohm ±5%; 0,33W	B54413-A2100-J
R5,32	2	22kOhm ±5%; 0,25W	B51263-A2223-J
R7,30	2	2,2kOhm ±5%; 0,25W	B51263-A2222-J
R8	1	2,2kOhm ±1%; 0,1W	B51263-A9222-F
R9	1	220 Ohm ±1%; 0,33W	B54413-A9221-F
R10	1	5,6kOhm ±1%; 0,25W	B51263-A2562-F
R11	1	820 Ohm ±5%; 0,33W	B54413-A2821-J
R13	1	50kOhm ±1%; 0,1W	B51263-A9503-F
R14	1	3,9kOhm ±5%; 0,25W	B51263-A2392-J
R15	1	1,5kOhm ±5%; 0,25W	B51263-A2152-J
R16	1	6,2kOhm ±5%; 0,2W	B51362-A2622-J
R17	1	75kOhm ±5%; 0,33W	B51263-A2753-J
R18	1	56 Ohm ±5%; 0,33W	B54413-A2560-J
R19	1	200 Ohm ±1%; 0,33W	B54413-A9201-F
R20	1	120 Ohm ±1%; 0,33W Wert wie eingebaut VALUE AS MOUNTED	B54413-A9121-F
R21	1	30kOhm ±5%; 0,25W	B51263-A2303-J
R22	1	6,8kOhm ±5%; 0,25W	B51263-A2682-J
R23	1	56kOhm ±1%; 0,1W	B51263-A9563-F
R24	1	560 Ohm ±1%; 0,33W	B54413-A9561-F
R25	1	18kOhm ±5%; 0,25W	B51263-A2183-J
R26,34	2	1,2kOhm ±1%; 0,1W	B51263-A9122-F
R27	1	2,7kOhm ±1%; 0,1W	B51263-A9272-F
R28	1	1,8kOhm ±5%; 0,25W	B51263-A2182-J
R29	1	390 Ohm ±1%; 0,33W	B54413-A9391-F
R31	1	150 Ohm ±5%; 0,33W	B54413-A2151-J
R33	1	12kOhm ±5%; 0,25W	B51263-A2123-J
R35,36	2	12kOhm ±1%; 0,1W	B51263-A9123-F
R37	1	100 Ohm ±5%; 0,33W	B54413-A2101-J
R38	1	1,8kOhm ±1%; 0,1W	B51263-A9182-F
R39	1	220 Ohm ±5%; 0,33W	B54413-A2221-J
R40	1	Thernewid THERM.RESISTOR 20kOhm ±5%; 3250°K	Q63011-K203-J
		Übertrager TRANSFORMER	
Ü1	1	C42035-A10-A3	V45231-C3139
Ü2	1	Rel sp 82i	Rel Bv 622 W 3035
		Spule COIL	
L1	1	Rel sp 82i	Rel Bv 622 W 3043
L2	1	Rel sp 82i	Rel Bv 622 W 3044
		Kf-Kondensator PLASTIC-FOIL CAPACITOR	
C2	1	80pF ±5%; 500V	B31141-A5800-J
C3	1	500pF ±1%; 500V	B31141-A5501-F
C4..6, C8,11,23 C25	8	MKL-Kondensator MKL-CAPACITOR 0,15/uF ±20%; 63V	B32110-E9154-M
C7	1	Kf-Kondensator PLASTIC-FOIL CAPACITOR 60pF ±5%; 500V	B31141-A5600-J
C9	1	Keramik-Kondensator CERAMIC CAPACITOR 22pF ±5%; 500V	B38222-J5220-J
C10	1	Kf-Kondensator PLASTIC-FOIL CAPACITOR 2500pF ±1%; 125V	B31141-A1252-F
C12	1	Tantal-Elko TANTALUM ELECTOLYTIC CAPACITOR 22/uF ±20%; 15V	B45170-A2226-M
C13,18 C19,20	4	MKH-Kondensator MKH-CAPACITOR 0,01/uF ±20%; 250V	B32220-K3103-M
		Keramik-Kondensator CERAMIC CAPACITOR	
C14	1	66pF ±2%; 500V	B38221-J5660-G
C16	1	20pF ±2,5%; 500V	B38221-J5200-H
C17	1	32pF ±2%; 500V	B38221-J5320-G
C22	1	Kf-Kondensator PLASTIC-FOIL CAPACITOR 1320pF ±1%; 125V	B31141-A1132-F200
C24	1	MKL-Kondensator MKL-CAPACITOR 0,22/uF ±20%; 63V	B32110-E9224-M
		Lufttrimmer AIR-DIELECTRIC TRIMMER	
C1	1	2...31 pF	Rel ko 130cb
C15	1	2,5...11 pF	Rel ko 131f

Kr1	1	Steuer-Quarz CONTROL-CRYSTAL Q34; f=100kHz	Q83404-A1000-G
	1	Halterung MOUNTING	C42121-A25-A2
Kr2	1	Filter-Quarz FILTER-CRYSTAL Q31; f=2,23975MHz	Q83124-C2239-H750
	1	Halterung MOUNTING	C42121-A25-A1
Gr1,2	2	Germanium-Diode GERMANIUM DIODE OA 90	Rel TL 672 R 108
Gr3	1	Zener-Diode ZENER DIODE SZ 7 KB	Q62604-K7-B
	1	Halterung MOUNTING	C42121-A9-A1
Gr4	1	Germanium-Diode GERMANIUM DIODE AAY 26	Q60101-Y26
Gr5	1	Silizium-Diode SILICON DIODE BAY 30	Q60201-Y30
	1	Halterung MOUNTING	C42121-A9-A1
		Transistor TRANSISTOR	
Ts1,2 Ts6..10	7	BCY / VIII	Q60203-Y58-H
Ts3,4	2	2 N 2218	Q62702-S0002
Ts5	1	MM 1614	Q62702-S55-F6
		Halterung MOUNTING	
	7	für Ts1,2,6..10 FOR Ts1,2,6..10	C42121-A11-C10
	3	für Ts3..5 FOR Ts3..5	C42121-A11-C6
	8	Isolierperle BEAD	C42187-Z7-C2

Verdrahtungsleiterplatte S45035-W670-A701
PRINTED CIRCUIT BOARD

C1	1	Tantal-Elko TANTALUM ELECTROLYTIC CAPACITOR 4,7/uF ±20%; 20V	B45170-A3475-M
L1	1	Drossel REACTOR 70/uH/0,2A	B82501-A-C18
	8	Lötstift SOLDERING PIN	C22195-Z11-C1

Oszillator II 0...10 kHz S45034-D370-A702
OSCILLATOR II 0...10 kHz

Verwendung: Pegelmesser S45034-D354-B302, B602
USED IN: LEVEL METER S45034-D354-B302, B602

Symbol SYMBOL	Stck QTY	Gegenstand DESCRIPTION	Bestellangabe ORDERING DATA	Seite PAGE
Pl.1	1	Interpolator-Platte 1 INTERPOLATOR BOARD 1	S45035-W671-A701	
Pl.2	1	Interpolator-Platte 2 INTERPOLATOR BOARD 2	S45035-W672-A701	
Pl.3	1	Interpolator-Platte 3 INTERPOLATOR BOARD 3	S45035-D627-A701	
	1	Verdrahtungs-leiterplatte PRINTED CIRCUIT BOARD	S45035-W674-A701	
R1	1	Schichtwiderstand LAYER-TYPE RESISTOR 600 Ohm ±1%; 0,33W	B54413-A9601-F	
C2	1	Lufttrimmer AIR-DIELECTRIC TRIMMER 1,3...5 pF	Rel ko 131ac	
C3	1	Keramik-Kondensator CERAMIC CAPACITOR 6pF ±0,5pF; 500V	B38212-A5060-D003	
K2	1	Drehko VAR. CAPACITOR 10/170pF C001 ZZ168 (Fa.Valvo)	Rel TL 632 B 3002a1	
Sz2	1	Allsichtschauzeichen INCICATOR h'grün/orange br'green/orange	V45282-Z3009-A1	
S7	1	Kleindrehschalter MIDGET ROTARY SWITCH	C40315-M303-N1	
	1	Kurbel-Drehknopf ROTARY KNOB FOR CRANK 37 ø	C44106-A20-A2	
	1	Drehknopf ROTARY KNOB	C44106-A20-A3	
	1	Knebelgriff ROTARY KNOB	Rel antr 93c	
Ü1	1	Übertrager TRANSFORMER	V45231-F3082	
BuD Bu10	2	Gerätebuchse gerade COAX JACK 1,6/5,6	C42334-A76-A14	
BuC	1	Schaltbuchse SWITCHING JACK 1,6/5,6; (1a, 1r)	C42334-A76-A34	
	1	Filmskalenantrieb FILM-SCALE DRIVE 1m grob/fein 1m COARSE/FINE	C44106-A7-A4	
	1	Membrankupplung MEMBRANE DRIVE COUPLING	C44106-A5-A61	

Pl.1 Interpolator-Platte 1 S45035-W671-A701
INTERPOLATOR BOARD 1

Schichtwiderstand
LAYER-TYPE RESISTOR

R1,12,21	3	150 Ohm ±5%; 0,33W	B54413-A2151-J
R2,26	2	2,7kOhm ±5%; 0,25W	B51263-A2272-J
R3	1	2,7kOhm ±1%; 0,1W	B51263-A9272-F
R4	1	1kOhm ±1%; 0,33W	B54413-A9102-F
R5	1	27kOhm ±5%; 0,25W	B51263-A2273-J
R6	1	8,2kOhm ±1%; 0,1W	B51263-A9822-F
R7	1	5,6kOhm ±1%; 0,1W	B51263-A9562-F
R8,25 R28	3	6,8kOhm ±5%; 0,25W	B51263-A2682-J
R9,13,29	3	18kOhm ±5%; 0,25W	B51263-A2183-J
R10,30	2	330 Ohm ±5%; 0,33W	B54413-A2331-J
R11,31	2	1,8kOhm ±5%; 0,25W	B51263-A2182-J
R14	1	4,3kOhm ±5%; 0,25W	B51263-A2432-J
R15	1	4,7kOhm ±1%; 0,1W	B51263-A9472-F
R16	1	200 Ohm ±1%; 0,33W	B54413-A9201-F
R17	1	1kOhm ±5%; 0,33W	B54413-A2102-J
R18	1	2,2kOhm ±5%; 0,25W	B51263-A2222-J
R19	1	100 Ohm ±5%; 0,33W	B54413-A2101-J
R20	1	10 Ohm ±5%; 0,33W	B54413-A2100-J
R22	1	100 Ohm ±1%; 0,33W	B54413-A9101-F
R23	1	560 Ohm ±5%; 0,33W	B54413-A2561-J
R24	1	470 Ohm ±5%; 0,33W	B54413-A2471-J
R27	1	820 Ohm ±5%; 0,33W	B54413-A2821-J

Übertrager
TRANSFORMER

Ü1	1	Rel sp 82i	Rel Bv 622 W 3032
Ü2	1	9 Rel sp 6h	Rel Bv 622 P 3417

MKL-Kondensator
MKL-CAPACITOR

C1	1	0,68 µF ±20%; 63V	B32110-E9684-M
C2..5,7 C9,15,17	8	0,15 µF ±20%; 63V	B32110-E9154-M
C6,8,14	3	0,33 µF ±20%; 63V	B32110-E9334-M

Keramik-Kondensator
CERAMIC CAPACITOR

C11	1	90pF ±1%; 500V	B38241-J5900-F003
C12	1	15pF ±5%; 500V Wert wie eingebaut/VALUE AS MOUNTED	B38246-J5150-J003
C13,16	2	MKL-Kondensator MKL-CAPACITOR 1,5 µF ±20%; 63V	B32110-E9155-M
C10	1	Lufttrimmer AIR-DIELECTRIC TRIMMER 2...31pF	Rel ko 130cb
Gr1	1	Diode DIODE OA 159	Q62701-A49-F2
Gr2	1	Zenerdiode ZENER DIODE Z7	Q62702-Z339-F4
	1	Halterung MOUNTING	C42121-A9-a1
Ts1 ..7	7	Transistor TRANSISTOR BCY 58 / VIII	Q60203-Y58-H
	7	Halterung MOUNTING	C42121-A11-C10

Pl.2 Interpolator-Platte 2 S45035-W672-A701
INTERPOLATOR BOARD 2

Schichtwiderstand
LAYER-TYPE RESISTOR

R1,7	2	33kOhm ±5%; 0,25W	B51263-A2333-J
R2	1	5,1kOhm ±5%; 0,25W	B51263-A2512-J
R3	1	2,7kOhm ±5%; 0,25W	B51263-A2272-J
R4	1	330 Ohm ±1%; 0,33W	B54413-A9331-F
R5,13	2	8,2kOhm ±1%; 0,1W	B51263-A9822-F
R6	1	270 Ohm ±5%; 0,33W	B54413-A2271-J
R8	1	5,6kOhm ±5%; 0,25W	B51263-A2562-J
R10,11,14	3	5,6kOhm ±1%; 0,1W	B51263-A9562-F
R12	1	2,5kOhm ±1%; 0,1W	B51263-A9252-F
R15	1	3,9kOhm ±5%; 0,25W	B51263-A2392-J
R16,18	2	8,2kOhm ±5%; 0,25W	B51263-A2822-J
R17	1	1kOhm ±5%; 0,33W	B54413-A2102-J
R19	1	1,5kOhm ±5%; 0,25W	B51263-A2152-J
R20,27	2	820 Ohm ±5%; 0,33W	B54413-A2821-J
R21,23	2	3kOhm ±1%; 0,1W	B51263-A9302-F
R22	1	1kOhm ±1%; 0,33W	B54413-A9102-F
R24	1	620 Ohm ±1%; 0,33W	B54413-A9621-F
R25	1	27kOhm ±1%; 0,1W	B51263-A9273-F
R26	1	9,1kOhm ±5%; 0,25W	B51263-A2912-J
R28	1	680 Ohm ±1%; 0,33W	B54413-A9681-F

Thernewid
THERM. RESISTOR

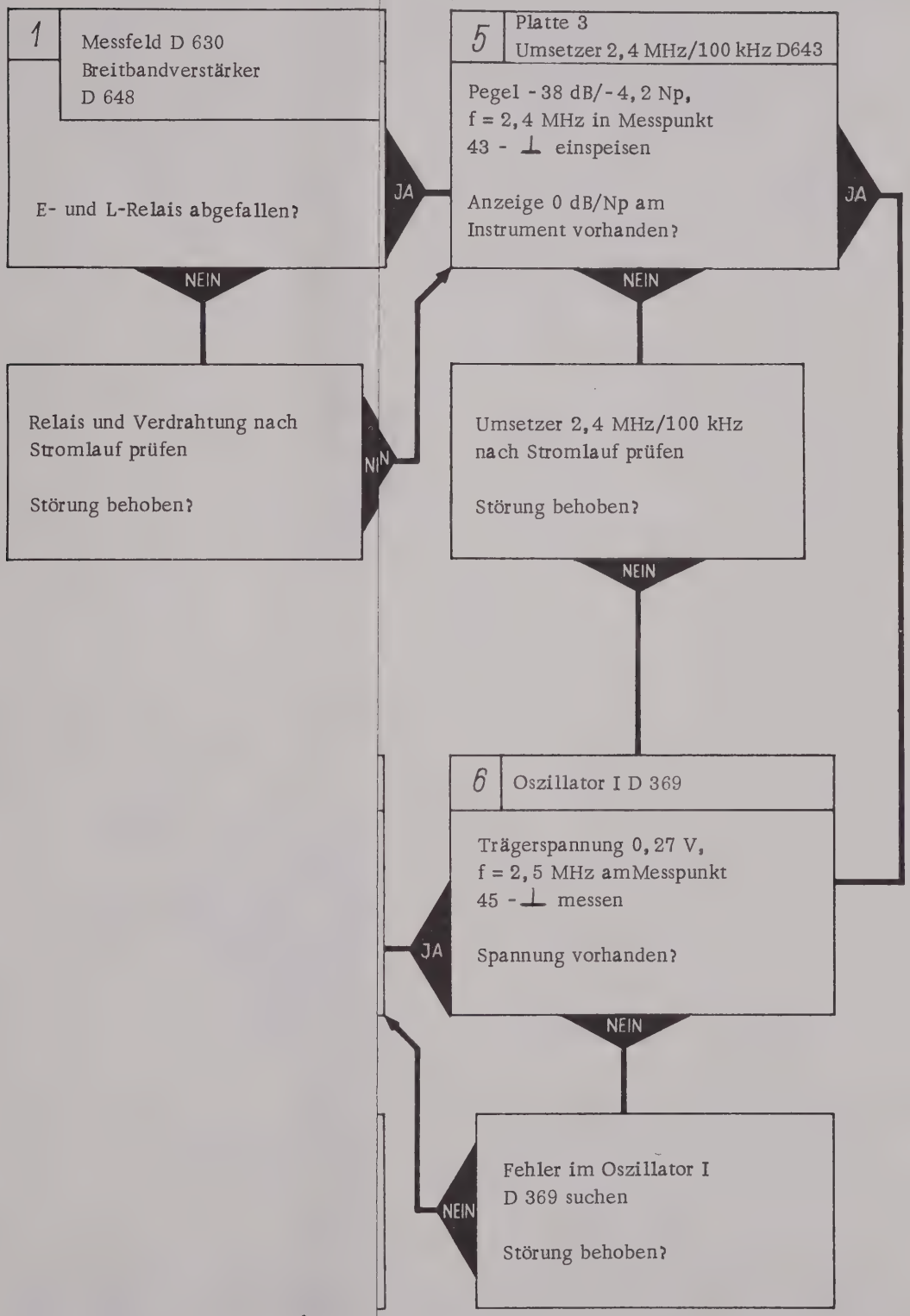
R30	1	200 Ohm ±5%; 3000°K	Q63011-K201-J
R31	1	1kOhm ±5%; 3240°K	Q63011-K102-J
Ü1	1	Übertrager TRANSFORMER	Rel Bv 622 W 3033
L1,2	2	Spule COIL	Rel Bv 622 W 3034
C1	1	Kf-Kondensator PLASTIC-FOIL CAPACITOR 2000pF ±5%; 125V	B31141-A1202-J

		MKL-Kondensator MKL-CAPACITOR	
C2	1	0,47/uF ±20%; 63V	B32110-E9474-M
C3,6	2	0,1/uF ±20%; 100V	B32110-D0104-M
C4	1	Keramik-Kondensator CERAMIC CAPACITOR 8pF ±0,5pF; 500V	B38211-J5080-D
C5	1	MKH-Kondensator MKH-CAPACITOR 0,047/uF ±20%; 250V	B32220-K3473-M
C7	1	MKL-Kondensator MKL-CAPACITOR 2,2/uF ±20%; 63V	B32110-E9225-M
		Kf-Kondensator PLASTIC-FOIL CAPACITOR	
C8,10	2	5000pF ±5%; 125V	B31142-A1502-J
C9	1	10000pF ±5%; 125V	B31142-A1103-J
		MKL-Kondensator MKL-CAPACITOR	
C11,12 C15,16	4	4,7/uF ±20%; 63V	B32110-E9475-M
C13	1	0,68/uF ±20%; 63V	B32110-E9475-M
C14	1	0,22/uF ±20%; 63V	B32110-E9224-M
C17	1	Kf-Kondensator PLASTIC-FOIL CAPACITOR 100pF ±5%; 500V	B31141-A5101-J
Gr1 ..4	4	Diode DIODE OA 90	Rel TL 672 R 108
		Transistor TRANSISTOR	
Ts1..3 Ts5,6	5	BCY 58 / VIII	Q60203-Y58-H
Ts4	1	2 N 3250	Q62702-F76
	6	Halterung MOUNTING	C42121-A11-C10
	2	Isolierperle BEAD	C42187-Z2-C2
Pl.3		Interpolator-Platte 3 S45035-D627-A701 INTERPOLATOR BOARD 3	
		Schichtwiderstand LAYER-TYPE RESISTOR	
R1,5	2	33kOhm ±5%; 0,25W	B51263-A2333-J
R2	1	8,2kOhm ±5%; 0,25W	B51263-A2822-J
R3	1	56kOhm ±1%; 0,1W	B51263-A9563-F
R4,25	2	560 Ohm ±1%; 0,33W	B54413-A9561-F
R6	1	1,2kOhm ±1%; 0,1W	B51263-A9122-F
R7	1	10kOhm ±5%; 0,25W	B51263-A2103-J
R8,18,20 R37	4	470 Ohm ±5%; 0,33W	B54413-A2471-J
R9	1	680 Ohm ±5%; 0,33W	B54413-A2681-J
R10,23,34	3	150 Ohm ±5%; 0,33W	B54413-A2151-J
R11	1	300 Ohm ±1%; 0,33W	B54413-A9301-F
R12	1	390 Ohm ±5%; 0,33W	B54413-A2391-J
R13..16,28	5	150 Ohm ±1%; 0,33W	B54413-A9151-F
R17	1	1,2kOhm ±5%; 0,25W	B51263-A2122-J
R19	1	3,9kOhm ±5%; 0,25W	B51263-A2392-J
R21	1	20kOhm ±5%; 0,25W	B51263-A2203-J
R22	1	27kOhm ±5%; 0,25W	B51263-A2273-J
R24	1	2,7kOhm ±1%; 0,1W	B51263-A9272-F
R26	1	30kOhm ±5%; 0,25W	B51263-A2303-J
R27	1	15kOhm ±5%; 0,25W	B51263-A2153-J
R29	1	220 Ohm ±5%; 0,33W	B54413-A2221-J
R30	1	68kOhm ±5%; 0,25W	B51263-A2683-J
R31	1	15kOhm ±1%; 0,1W	B51263-A9153-F
R32	1	27kOhm ±1%; 0,1W	B51263-A9273-F
R33	1	560 Ohm ±5%; 0,33W	B54413-A2561-J
R35	1	56kOhm ±5%; 0,25W	B51263-A2563-J
R36	1	2,2kOhm ±5%; 0,25W	B51263-A2222-J
		Übertrager TRANSFORMER	Rel Bv 622 W 3035
Ü1	1	Rel sp 82i	Rel Bv 622 W 3035
Ü2	1	Rel sp 82i	Rel Bv 622 W 3036
Ü3	1	Rel sp 82i	Rel Bv 622 W 3037
Ü4	1	Rel sp 82i	Rel Bv 622 W 3038
Ü5	1	9 Rel sp 6h	Rel Bv 622 P 3418
C1	1	Keramik-Kondensator CERAMIC CAPACITOR 66pF ±5%; 500V	B38221-J5660-J
C2,6,8,9 C11..13, C15..17, C19,23	12	MKH-Kondensator MKH-CAPACITOR 0,01/uF ±20%; 250V	B32220-K3103-M
		Keramik-Kondensator CERAMIC CAPACITOR	
C3	1	25pF ±2%; 500V	B38221-J5250-G
C5	1	32pF ±2%; 500V	B38221-J5320-G
		Kf-Kondensator PLASTIC-FOIL CAPACITOR	
C7	1	113pF ±1%; 500V	B31141-A5111-F300
C10	1	1000pF ±5%; 500V	B31141-A5102-J
C14	1	444pF ±1%; 500V	B31141-A5441-F400
C18	1	MKL-Kondensator MKL-CAPACITOR 0,1/uF ±20%; 100V	B32110-D0104-M
		Keramik-Kondensator CERAMIC CAPACITOR	
C20	1	90pF ±2%; 500V	B38221-J5900-G
C22	1	36pF ±2%; 500V	B38222-J5360-G
		Lufttrimmer AIR-DIELECTRIC TRIMMER	
C4	1	2,5...11pF	Rel ko 131f
C21	1	1,7...19pF	Rel ko 130ca
Kr1	1	Filter-Quarz FILTER'CRYSTAL Q31; F=2,23975 MHz	Q83124-C2239-H750
	1	Halterung MOUNTING	C42121-A25-A1
Gr1,2	2	Diode DIODE	Rel TL 672 R 108
Gr3	1	Zener-Diode ZENER DIODE Z7	Q62702-Z339-F4
	1	Halterung MOUNTING	C42121-A9-A1
Gr5,6	2	Varaktordiode VARACTOR DIODE 70pF +5%; bei/AT -4V/25°C HC 7004B (Fa.Hughes)	Rel TL 672 R 129a10
Md1	1	Richtleiterquartett DIODE QURTET 4xOA 90	V42292-E4-A1
Ts1 ..8	8	Transistor TRANSISTOR BCY 58 / VIII	Q60203-Y58-H
	8	Halterung MOUNTING	C42121-A11-C10
		Verdrahtungsleiterplatte S45035-W674-A701 PRINTED CIRCUIT BOARD	
C1	1	Tantal-Elko TANTALUM ELECTROLYTIC BOARD 4,7/uF ±20%; 20V	B45170-A3475-M
L1	1	Drossel REACTOR 70/uH/0,2A	B82501-A-C18
	7	Lötstift SOLDERING PIN	C22195-Z11-C1

Einstellen:

▼ II in Mittelstellung
f_1 = 100 kHz, S6: gerastet
f_2 = 0 kHz, S7: 0 Hz

T4: gedrü
S3: 0 dB/ss- und Anschlusspunkte siehe
S4: dB/Np5034-D354-B302, B602-x-7411
S5: 1 600 5034-D354-B602-x-7402



(T3 oder T4 gedrückt),
z, 40 Hz, 1 600 Hz)

Bildanlage 2

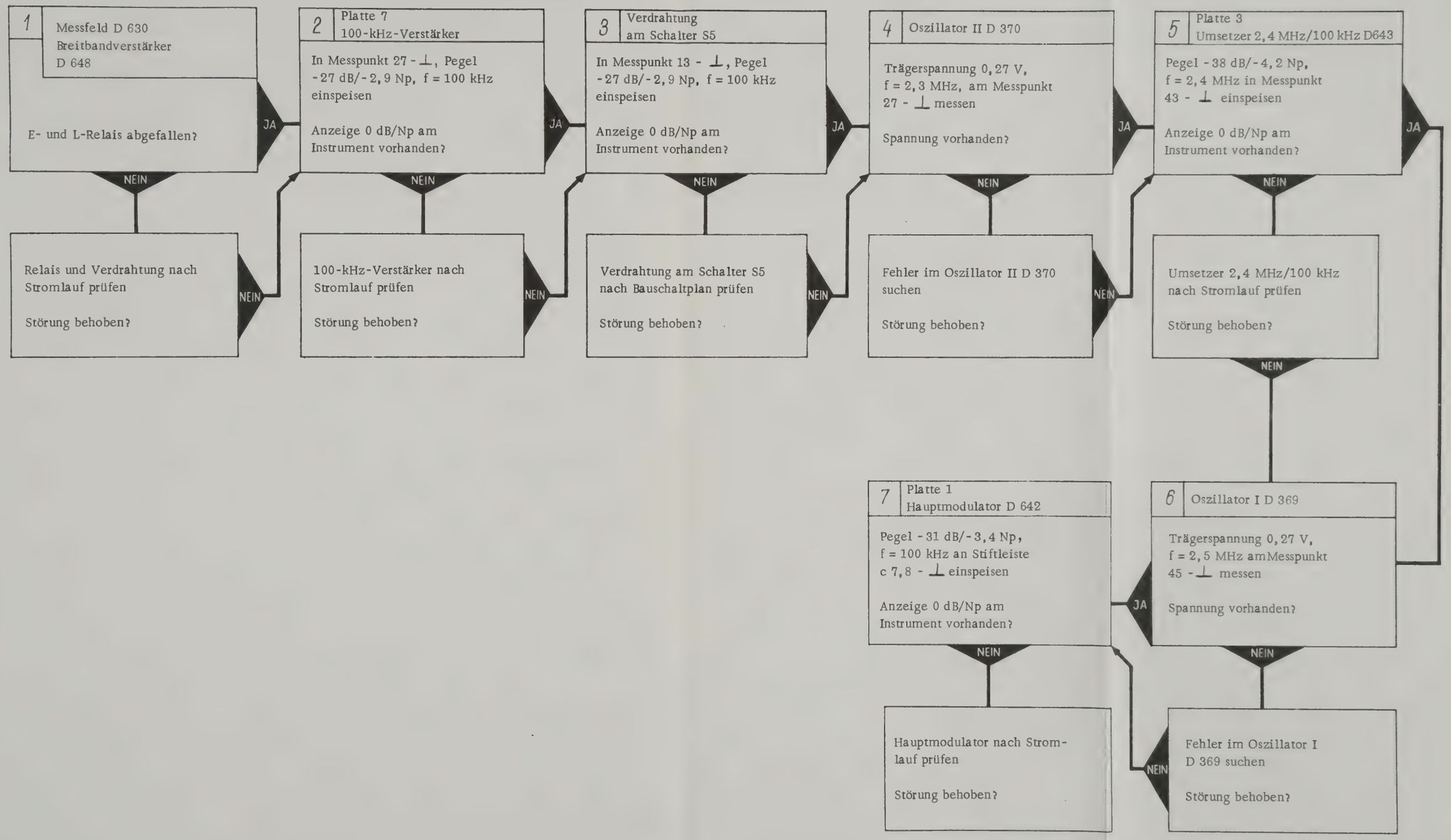
SIEMENS

Einstellen:

▼ II in Mittelstellung
f_1 = 100 kHz, S6: gerastet
f_2 = 0 kHz, S7: 0 Hz

T4: gedrückt
S3: 0 dB/Np
S4: dB/Np
S5: 1 600 kHz

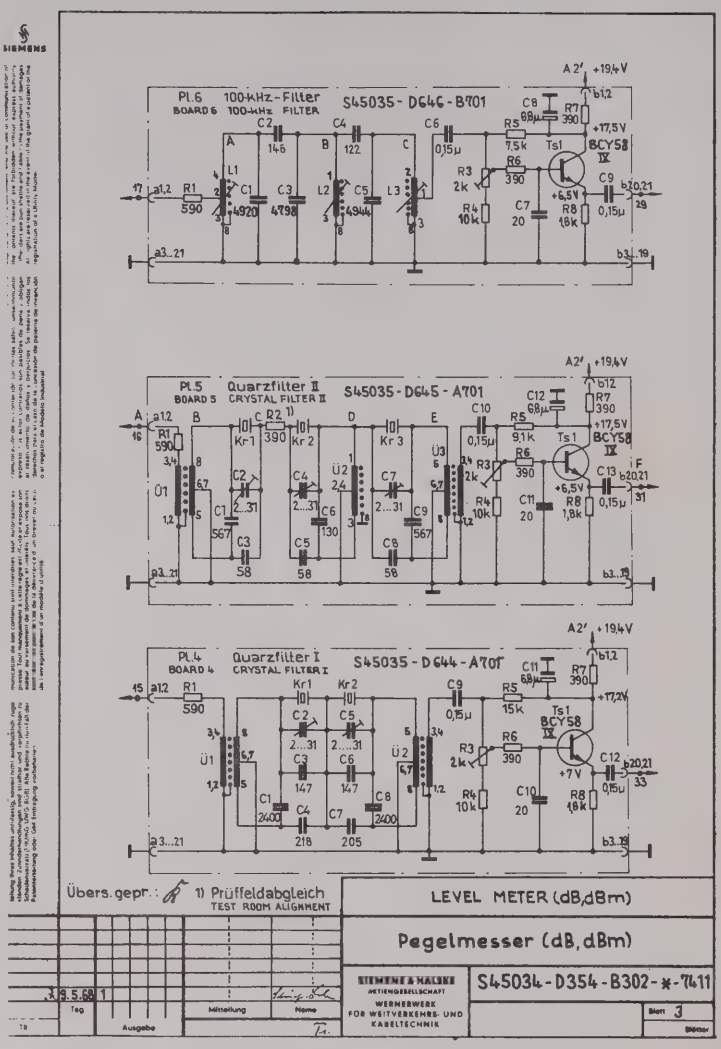
Mess- und Anschlusspunkte siehe
S45034-D354-B302, B602-x-7411
S45034-D354-B602-x-7402

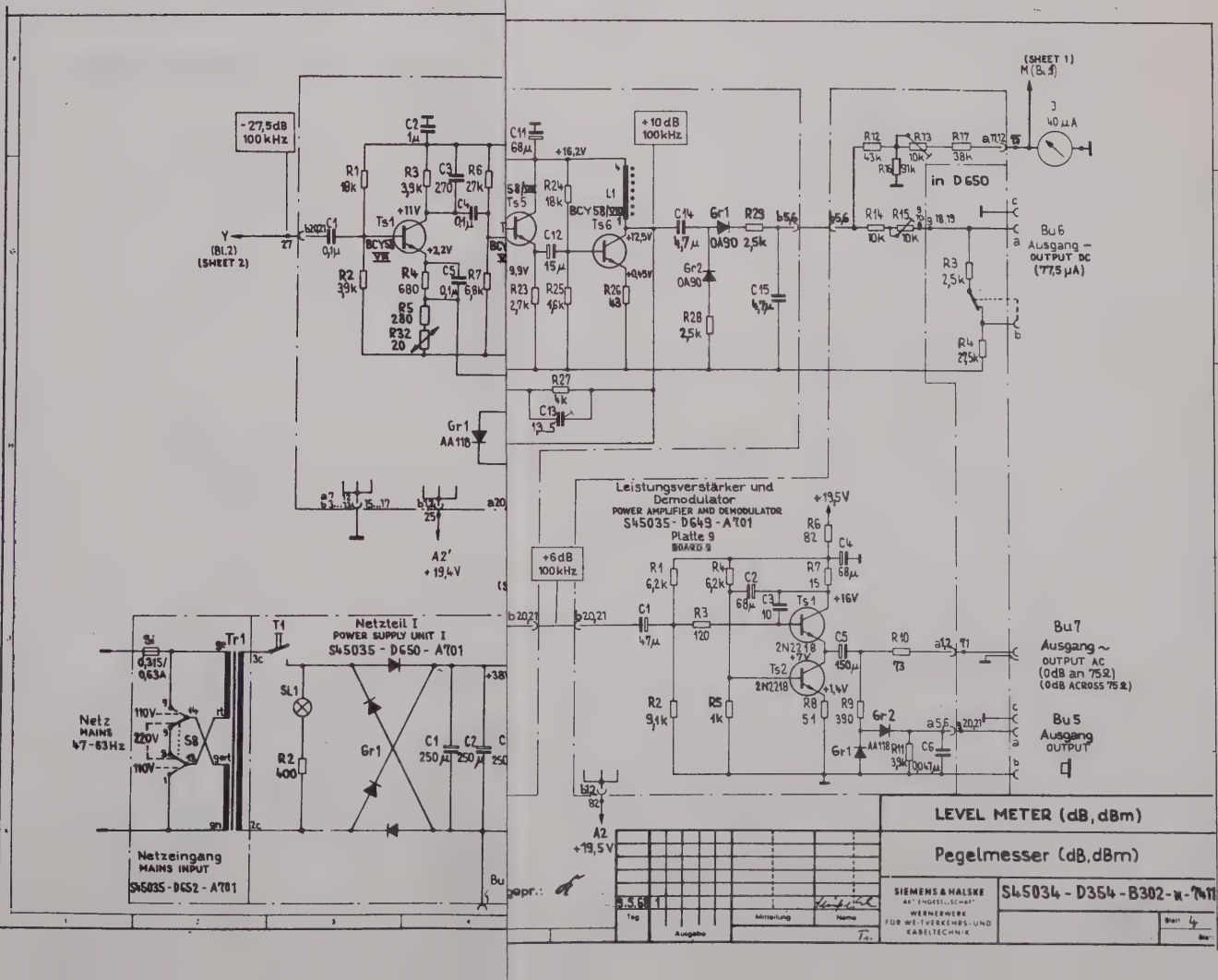


Fehlersuche, Befund: Messen selektiv (T3 oder T4 gedrückt), bei allen drei Durchlassbreiten (10 Hz, 40 Hz, 1 600 Hz) und ▼ II nicht möglich

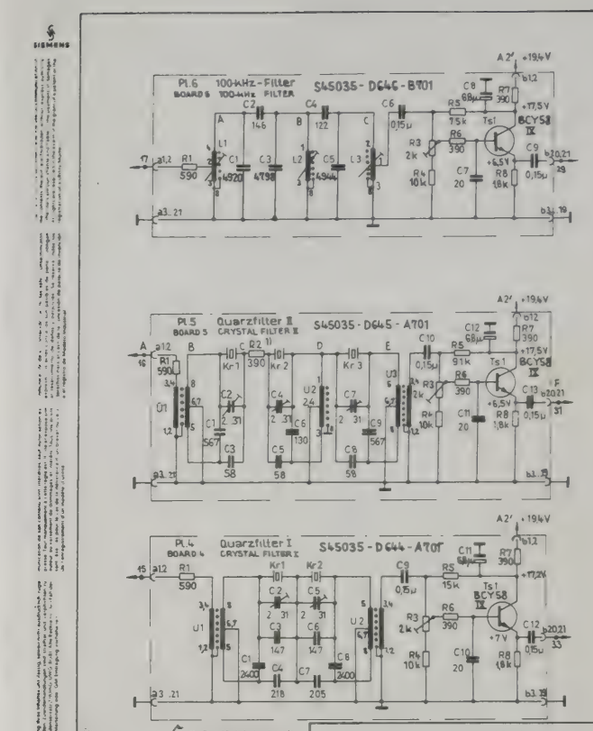
Bildanlage 2

SIEMENS AKTIENGESELLSCHAFT
Wernerwerk für Weitverkehrs- und Kabeltechnik


Pt.6 100-kHz-Filter
BOARD 6 100-kHz FILTER
S45035-D646-B701
Pt.5 Quarzfilter II
BOARD 5 CRYSTAL FILTER II
S45035-D645-A701
Pt.4 Quarzfilter I
BOARD 4 CRYSTAL FILTER I
S45035-D644-A701
A2' +19,4V
+17,5V
+6,5V
+17,2V
+7V
BCY58 IX
Übers.gepr.:
1) Prüffeldabgleich
TEST ROOM ALIGNMENT
LEVEL METER (dB,dBm)
Pegelmesser (dB,dBm)
SIEMENS & HALSKE
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK
S45034-D354-B302-*-7411
Blatt 3


(SHEET 1)
M (Bl.1)
J 40 µA
in D650
Bu6 Ausgang – OUTPUT DC (77,5 µA)
Bu7 Ausgang ~ OUTPUT AC (0dB an 75Ω) (0dB ACROSS 75Ω)
Bu5 Ausgang OUTPUT
-27,5dB 100kHz
+10dB 100kHz
+6dB 100kHz
Y (Bl.2) (SHEET 2)
A2' +19,4V
A2 +19,5V
Gr1 AA118
Gr2 0A90
Leistungsverstärker und Demodulator
POWER AMPLIFIER AND DEMODULATOR
S45035-D649-A701
Platte 9 BOARD 9
+19,5V
+16V
+14V
Netzteil I
POWER SUPPLY UNIT I
S45035-D650-A701
Netz MAINS 47-63Hz
110V 220V 110V
SL1
Netzeingang MAINS INPUT
S45035-D652-A701
LEVEL METER (dB,dBm)
Pegelmesser (dB,dBm)
SIEMENS & HALSKE
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK
S45034-D354-B302-*-7411
Blatt 4

SIEMENS



Übers.gepr.: 11 Prüffeldabgleich
TEST ROOM ALIGNMENT

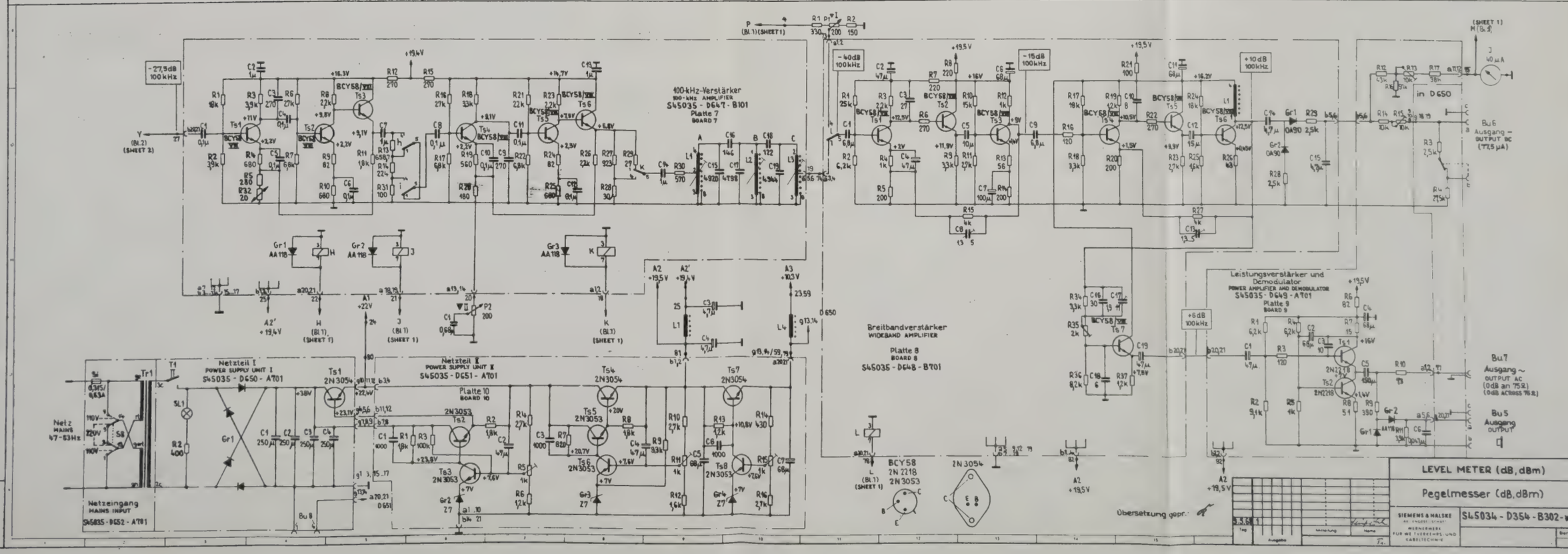
LEVEL METER (dB,dBm)

Pegelmesser (dB,dBm)

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45034-D354-B302-*-7611

Blatt 3



LEVEL METER (dB,dBm)

Pegelmesser (dB,dBm)

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45034-D354-B302-*-7611

Blatt 4

Eing.-Wahlschalter S1 INPUT SELECTOR SWITCH		
Stllg. POS	Eing. INPUT	Eing.-Widerstd. INPUT IMPEDANCE
1	koax COAX	mit Tastteiler WITH PROBE DIVIDER
2		Z
3		10 kΩ // 60pF
4	sym. BAL	≥ 10 kΩ
5		Z

Z-Schalter S2 IMPEDANCE SWITCH S2	
Stllg POS	Z/Ω
1	75
2	125
3	135
4	140
5	150
6	600

Stllg POS	Np/Npm Np/Npm
1	Spannun (U₀ = VOLTAGE)
2	Leistun (P₀ = POWER

1) Prüffeldabgleich TEST ROOM ALIGNMENT
2) in D G34 enthalten CONTAINED IN D G34
3) Wert und VALUE AND IN TEST ROOM

Drucktaste T2,3,4 PUSH BUTTON	T2 breitb. gedrückt T2 WIDEBAND PUSHED				T3 sel. klirrarm gedrückt T3 SELECT/LOW DISTORTION PUSHED				T4 sel. rauscharm gedrückt T4 SELECT/LOW NOISE PUSHED			
Np/Npm Schalter S4 SWITCH S4	Np		Npm		Np		Npm		Np		Npm	
Eingang INPUT	sym. BAL	koax COAX	sym. BAL	koax COAX	sym. BAL	koax COAX	sym. BAL	koax COAX	sym. BAL	koax COAX	sym. BAL	koax COAX
Stellung POS	Meßbereichschalter S3 MEASURING RANGE SWITCH S3											
1	▼ I		—	—	▼ II		—	—	—	—	—	—
2	—	+2	—	—	—	—	—	—	—	+2	—	—
3	—	+1	—	+2	—	—	—	—	—	+1	—	+2
4	+2	0	—	+1	+2	0	—	+1	+2	0	—	+1
5	+1	-1	+2	0	+1	-1	+2	0	+1	-1	+2	0
6	0	-2	+1	-1	0	-2	+1	-1	0	-2	+1	-1
7	-1	-3	0	-2	-1	-3	0	-2	-1	-3	0	-2
8	-2	-4/8	-1	-3	-2	-4/8	-1	-3	-2	-4/8	-1	-3
9	-3	-5	-2	-4/8	-3	-5	-2	-4/8	-3	-5	-2	-4/8
10	-4	-6	-3	-5	-4	-6	-3	-5	-4	-6	-3	-5
11	-5	-7	-4	-6	-5	-7	-4	-6	-5	-7	-4	-6
12	—	—	—	—	-6	-8	-5	-7	-6	-8	-5	-7
13	—	—	—	—	-7	-9	-6	-8	—	—	—	—
14	—	—	—	—	-8	-10	-7	-9	—	—	—	—
15	—	—	—	—	-9	-11	-8	-10	—	—	—	—
16	—	—	—	—	-10	-12	-9	-11	—	—	—	—
17	—	—	—	—	-11	-13	-10	-12	—	—	—	—
18	———				———							
19	———				———							
20	———				———							
21	———				Dynamikausgang, Eingang koaxial, Np LARGE AMPL. SWING INPUT							
22	———				" " " , Np							
23	———				" " symmetrisch, N							
24	———				" " " , Np							

Relaisplatte
RELAY BOARD
S45035-DG37-A401

Meßfeld
MEASURING FIELD
S45035 - D630 - B601

Übers. gepr.:

LEVEL METER (Np,Npm)

Pegelmesser (Np,Npm)

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45034 - D354 - B602 - * - 7411

Blatt 1

Hauptmodula
MAIN MODULATO
S45035 - DG42
Platte 1
BOARD 1

Eichoszillator
CALIBRATING OSCILLATOR
S45035 - D641 - B401
Platte 2
BOARD 2

S45034 - D354 - B602 - * - 7411 Bl. 3 SHEET 3

100kHz - Filter
100kHz FILTER
S45035 - DG46 - B701

Quarzfilter II
CRYSTAL FILTER II
S45035 - DG45 - A701

Quarzfilter I
CRYSTAL FILTER I
S45035 - DG44 - A701

Ausgang Dynamik
OUTPUT LARGE AMPL SWING
ZF/IF 100 kHz
Bu 4

Schalter S5
SWITCH

Stellg. POS	Durchlaßbreite Δa ≤ 0,05 Np PASS-BAND	Bandbreite Δa = 0,35 Np BANDWIDTH
1	10 Hz	~ 20 Hz
2	40 Hz	~ 80 Hz
3	1600 Hz	~ 3,1 kHz

Übersetzung gepr.:

LEVEL METER (Np,Npm)

Pegelmesser (Np,Npm)

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45034 - D354 - B602 - * - 7411

Blatt 2

Eing.-Wahlschalter S1 INPUT SELECTOR SWITCH		
Stllg POS	Eing. INPUT	Eing.-Widerstd. INPUT IMPEDANCE
1		mit Tastteiler WITH PROBE DIVIDER
2	koax COAX	Z
3		10 kΩ // 60pF
4		≥ 10 kΩ
5	sym BAL	Z

Z-Schalter S2 IMPEDANCE SWITCH S2	
Stllg POS	Z/Ω
1	75
2	125
3	135
4	140
5	150
6	600

Stllg POS	Np/Npm-Schalter S4 Np/Npm-SWITCH S4
1	Spannungspegel Np (U_0=0,775V) VOLTAGE LEVEL Np
2	Leistungspegel Npm (P_0 = 1mW) POWER LEVEL Npm

1) Prüffeldabgleich
TEST ROOM ALIGNMENT

2) in D 634 enthalten
CONTAINED IN D 634

3) Wert und Einbau bestimmt Prüff.
VALUE AND MOUNTING IS DETERMINED IN TEST ROOM

Drucktaste T2,3,4 PUSH BUTTON	T2 breitb. gedrückt T2 WIDEBAND PUSHED				T3 sel. klirrarm gedrückt T3 SELECT/LOW DISTORTION PUSHED				T4 sel. rauscharm gedrückt T4 SELECT/LOW NOISE PUSHED			
Np/Npm Schalter S4 SWITCH S4	Np		Npm		Np		Npm		Np		Npm	
Eingang INPUT	sym BAL	koax COAX	sym BAL	koax COAX	sym BAL	koax COAX	sym BAL	koax COAX	sym BAL	koax COAX	sym BAL	koax COAX
Stellung POS	Meßbereichschalter S3 MEASURING RANGE SWITCH S3											
1	▼ I		—	—	▼ II		—	—	—	—	—	—
2	—	+2	—	—	—	—	—	—	—	+2	—	—
3	—	+1	—	+2	—	—	—	—	—	+1	—	+2
4	+2	0	—	+1	+2	0	—	+1	+2	0	—	+1
5	+1	-1	+2	0	+1	-1	+2	0	+1	-1	+2	0
6	0	-2	+1	-1	0	-2	+1	-1	0	-2	+1	-1
7	-1	-3	0	-2	-1	-3	0	-2	-1	-3	0	-2
8	-2	-4/Ω	-1	-3	-2	-4/Ω	-1	-3	-2	-4/Ω	-1	-3
9	-3	-5	-2	-4/Ω	-3	-5	-2	-4/Ω	-3	-5	-2	-4/Ω
10	-4	-6	-3	-5	-4	-6	-3	-5	-4	-6	-3	-5
11	-5	-7	-4	-6	-5	-7	-4	-6	-5	-7	-4	-6
12	—	—	—	—	-6	-8	-5	-7	-6	-8	-5	-7
13	—	—	—	—	-7	-9	-6	-8	—	—	—	—
14	—	—	—	—	-8	-10	-7	-9	—	—	—	—
15	—	—	—	—	-9	-11	-8	-10	—	—	—	—
16	—	—	—	—	-10	-12	-9	-11	—	—	—	—
17	—	—	—	—	-11	-13	-10	-12	—	—	—	—
18	—											
19	—											
20	—											
21	—				Dynamikausgang, Eingang koaxial, Np LARGE AMPL. SWING INPUT							
22	—				"		"				,Npm	
23	—				"		"				symmetrisch, Np	
24	—				"		"				,Npm	

Eingang koaxial INPUT COAXIAL Bu1

Eingang symm. Bu2 INPUT BAL

Eingangsbaugruppe INPUT SUBASSEMBLY S45035-DG31-A401

S45035-DG30-B601 enthält: CONTAINS:

Eingangsbaugruppe INPUT SUBASSEMBLY	S45035-DG31-A401
Eingangswahlschalter S1 INPUT SELECTOR SWITCH	S45035-DG32-A701
Z-Schalter S2 IMPEDANCE SWITCH	S45035-DG33-A701
Meßbereichschalter S3 MEASURING RANGE SWITCH	S45035-DG34-B401
Trennstufe BUFFER STAGE	S45035-DG35-A401
Vorverstärker PREAMPLIFIER	S45035-DG36-A401
Relaisplatte RELAY BOARD	S45035-DG37-A401

ohne Baugr. Umgrenzung
WITHOUT SUBASSEMBLY LIMITING

Trennstufe BUFFER STAGE S45035-DG35-A401

Vorverstärker PREAMPLIFIER S45035-DG36-A401

Relaisplatte RELAY BOARD S45035-DG37-A401

z Breitbandverstärker (Bl 4) TO WIDEBAND AMPL. (SHEET 4)

z Hauptmodulator (Bl 2) TO MAIN MOD (SHEET 2)

T2 breitbandig WIDEBAND

T3 selektiv klirrarm gedrückt SELECTIVE LOW-DISTORTION PUSHED

T4 selektiv rauscharm SELECTIVE LOW NOISE

Meßfeld MEASURING FIELD S45035-DG30-B601

Gleichspannungen mit µA-Multizet 50kΩ/V gemessen eingespeister Pegel bei 0Np-Anzeige am Instrument, S1=koax., S3: 0-Np, S4: Np (U_0=0,775V), S5: 40Hz
T4 gedrückt, P2 in Mittelstellung, f_1=100kHz gerastet, f_2=0Hz gerastet

DC VOLTAGE MEASURED WITH µA MULTIZET METER OF 50kΩ/V INJECTED LEVEL AT 0-Np INDICATION ON THE INSTRUMENT, S1: COAX, S3: 0-Np, S4: Np (U_0=0,775V), S5: 40Hz, T4: PUSHED, P2 IN MID-POSITION, f_1=100kHz WITH SPECTRUM LOCK-IN, f_2=0Hz WITH SPECTRUM LOCK-IN

W231 W518 Z~0 / Ri~0

Meßschaltung: Pegelsender
MEASURING CIRCUIT: LEVEL OSCILLATOR

2N2218 2N2219

-8Np -5Np Eichpegel CALIBRATING LEVEL

Übers. gepr.:

LEVEL METER (Np, Npm)

Pegelmesser (Np, Npm)

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45034-D354-B602-x-7411

Blatt 1, 6

Hauptmodulator MAIN MODULATOR S45035-D642-A701 Platte 1 BOARD 1

Eichoszillator CALIBRATING OSCILLATOR S45035-D641-B401 Platte 2 BOARD 2

Umsetzer 2,4 MHz - 100 kHz CONVERTER 2,4-MHz - 100 kHz S45035-DG43-A401 Platte 3 BOARD 3

100kHz - Filter 100kHz FILTER S45035-DG46-B701

Quarzfilter II CRYSTAL FILTER II S45035-DG45-A701

Quarzfilter I CRYSTAL FILTER I S45035-DG44-A701

Ausgang Dynamik OUTPUT LARGE AMPL SWING ZF/IF 100 kHz Bu4

Schalter S5 SWITCH

Stellg POS	Durchlaßbreite Δa ≤ 0,05 Np PASS-BAND	Bandbreite Δa -0,35 Np BANDWIDTH
1	10 Hz	~ 20 Hz
2	40 Hz	~ 80 Hz
3	1600 Hz	~ 3,1 kHz

Oszillator I OSCILLATOR I D 369

x) Prüffeldabgleich TEST ROOM ALIGNMENT

Oszillator II OSCILLATOR II D 370

Übersetzung gepr.:

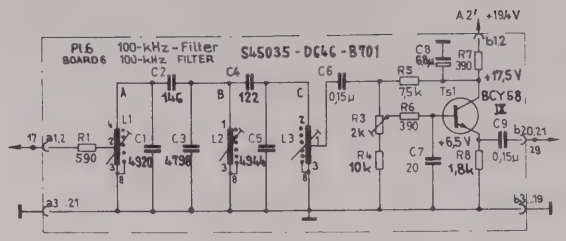
LEVEL METER (Np, Npm)

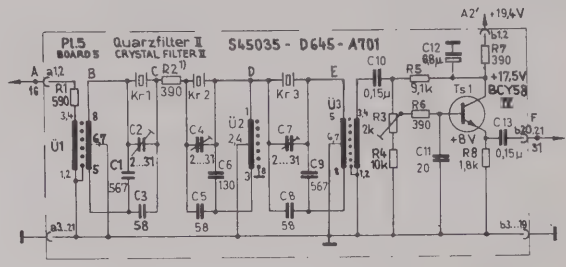
Pegelmesser (Np, Npm)

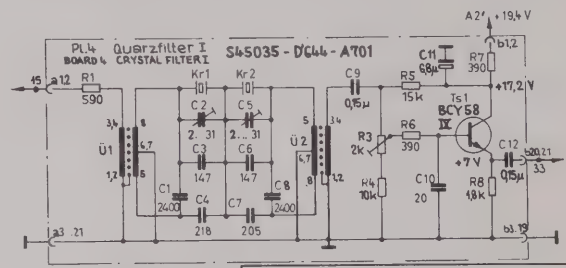
SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45034-D354-B602-x-7411

Blatt 2







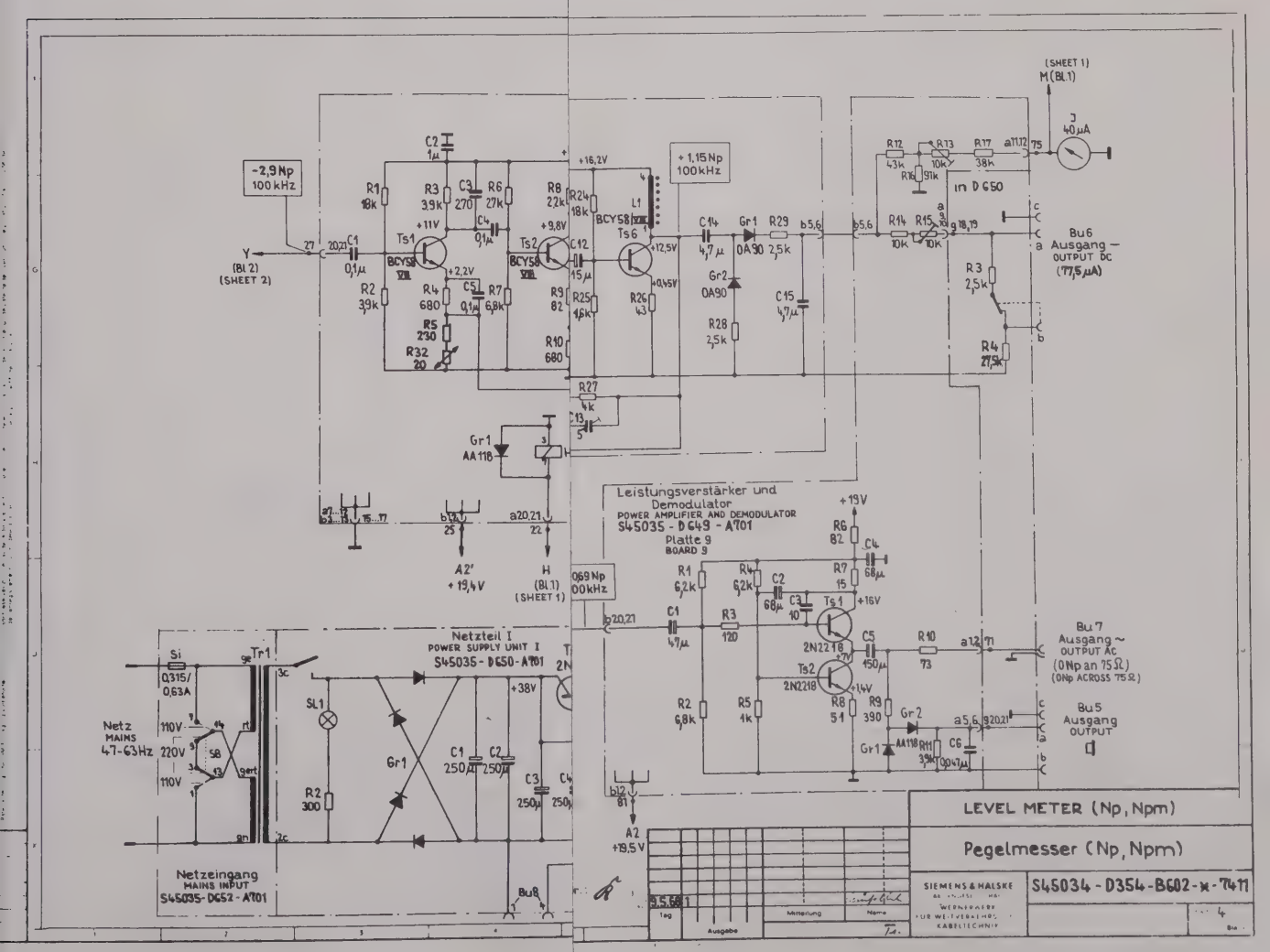
Übers. gepr.: 1) Prüffeldabgleich TEST ROOM ALIGNMENT

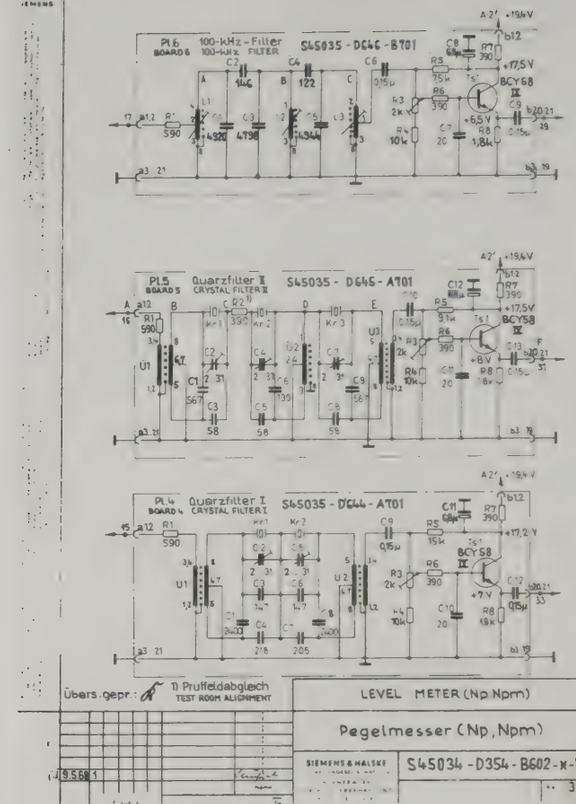
LEVEL METER (Np, Npm)

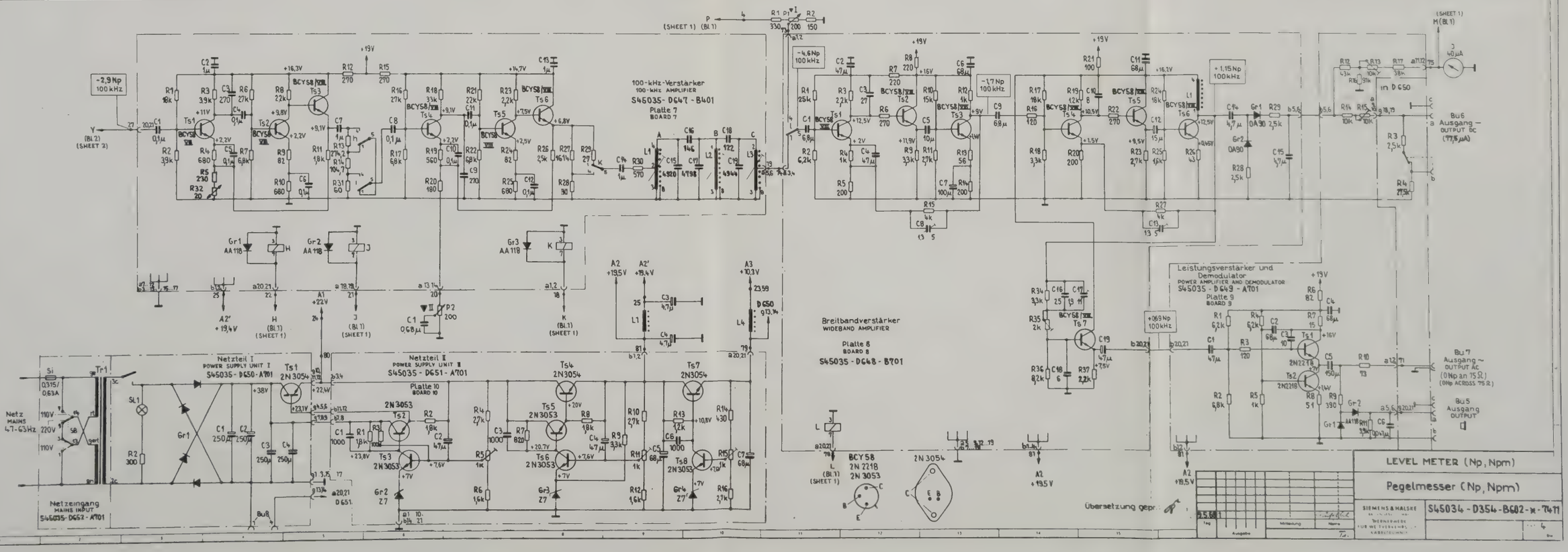
Pegelmesser (Np, Npm)

SIEMENS & HALSKE

S45034 - D354 - B602 - x - 7411




Pl6 BOARD 6
100-kHz-Filter
100-kHz FILTER
S45035 - D646 - B701
Pl5 BOARD 5
Quarzfilter II
CRYSTAL FILTER II
S45035 - D645 - A701
Pl4 BOARD 4
Quarzfilter I
CRYSTAL FILTER I
S45035 - D644 - A701
Übers. gepr.:
1) Prüffeldabgleich
TEST ROOM ALIGNMENT
LEVEL METER (Np,Npm)
Pegelmesser (Np, Npm)
SIEMENS & HALSKE
S45034 - D354 - B602 - x - 7411


-2,9Np 100kHz
100-kHz-Verstärker
100-kHz AMPLIFIER
S45035- D647 - B401
Platte 7
BOARD 7
-4,6Np 100kHz
-1,7Np 100kHz
+1,15Np 100kHz
+0,69Np 100kHz
Leistungsverstärker und Demodulator
POWER AMPLIFIER AND DEMODULATOR
S45035 - D649 - A701
Platte 9
BOARD 9
Breitbandverstärker
WIDEBAND AMPLIFIER
Platte 8
BOARD 8
S45035 - D648 - B701
Netzteil I
POWER SUPPLY UNIT I
S45035 - D650 - A701
Netzteil II
POWER SUPPLY UNIT II
S45035 - D651 - A701
Platte 10
BOARD 10
Netzeingang
MAINS INPUT
S45035 - D652 - A701
Netz
MAINS
47-63Hz
BCY58
2N 2218
2N 3053
2N 3054
Übersetzung gepr.:
LEVEL METER (Np,Npm)
Pegelmesser (Np, Npm)
SIEMENS & HALSKE
S45034 - D354 - B602 - x - 7411

Eing.-Wahlschalter S1 INPUT SELECTOR SWITCH S1		
Stllg. POS	Eing. INPUT	Eing. Widerst. INPUT IMPEDANCE
1	koax COAX	mit Tastteiler WITH PROBE DIVIDER
2		Z
3		10 kΩ // 60pF
4	sym BAL	> 10 kΩ
5		Z

Z-Schalter S2 IMPEDANCE SWITCH S2	
Stllg. POS	Z/Ω
1	75
2	125
3	135
4	140
5	150
6	600

1) Prüffeldabgleich TEST ROOM ALIGNMENT

2) in D G34 enthalten CONTAINED IN D G34

3) Wert un... VALUE AN... IN TEST ...

Drucktaste PUSH BUTTON T2,3,4	T2 breitb. gedrückt WIDEBAND PUSHED				T3 sel. klirrarm gedrückt T3 SELECT LOW-DISTORTION PUSHED				T4 sel. rauscha... gedrückt T4 SELECT LOW-N... PUSHED			
Schalter S4 SWITCH S4	dB		dBm		dB		dBm		dB		dB	
Eingang INPUT	sym. BAL	koax. COAX	sym. BAL	koax. COAX	sym. BAL	koax. COAX	sym. BAL	koax. COAX	sym. BAL	koax. COAX	sym. BAL	
Stellung POS	Meßbereichschalter S3 MEASURING RANGE SWITCH S3											
1	▼I	—	—	—	▼II	—	—	—	—	—	—	
2	—	+20	—	—	—	—	—	—	—	+20	—	
3	—	+10	—	+20	—	—	—	—	—	+10	—	
4	+20	0	—	+10	+20	0	—	+10	+20	0	—	
5	+10	-10	+20	0	+10	-10	+20	0	+10	-10	+20	
6	0	-20	+10	-10	0	-20	+10	-10	-0	-20	+10	
7	-10	-30	0	-20	-10	-30	0	-20	-10	-30	0	
8	-20	-40	-10	-30	-20	-40	-10	-30	-20	-40	-10	
9	-30	-50	-20	-40	-30	-50	-20	-40	-30	-50	-20	
10	-40dB	-60	-30	-50	-40dB	-60	-30	-50	-40dB	-60	-30	
11	—	—	—	—	-50	-70	-40	-60	-50	-70	-40	
12	—	—	—	—	-60	-80	-50	-70	-60	-80	-50	
13	—	—	—	—	-70	-90	-60	-80	—	—	—	
14	—	—	—	—	-80	-100	-70	-90	—	—	—	
15	—	—	—	—	-90	-110	-80	-100	—	—	—	
16	—	—	—	—	-100	-120	-90	-110	—	—	—	
17	———											
18	———				—							
19	———				—							
20	———				Dynamikausgang, Eingang koaxial, d... LARGE AMPL SWING, INPUT							
21	———				" " "							
22	———				" " symmetrisch,							
23	———				" " "							

Meßfeld
MEASURING FIELD
S45035 - D630 - B301

Relaisplatte
RELAY BOARD
S45035-D637 - A101

Übers. gepr.:

LEVEL METER (dB,dBm)

Pegelmesser (dB,dBm)

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERKE FÜR MEITVERKEHRS- UND KABELTECHNIK

S45034 - D354 - B302 - x - 7411

Blatt 1
4 Blätter

Hauptmodu...
MAIN MODULA...
S45035 - D642 ...

Platte
BOARD 1

S45034 - D354 - B302 - x - 7411 BL 3 SHEET 1

100-kHz - Filter
100-kHz FILTER
S45035 - D646 - B701

Quarzfilter II
CRYSTAL FILTER II
S45035 - D645 - A701

Quarzfilter I
CRYSTAL FILTER I
S45035 - D644 - A701

Ausgang Dynamik
OUTPUT LARGE AMPL SWING
ZF 100 kHz
Bu 4

Eichoszillator
CALIBRATING OSCILLATOR
S45035 - D641 - B101

Schalter S5
SWITCH

Stellg. POS	Durchlaßbreite Δa ≙ 0,5 dB PASS - BAND	Bandbreite Δa = 3dB BANDWIDTH
1	10 Hz	~ 20 Hz
2	40 Hz	~ 80 Hz
3	1600 Hz	~ 3,1kHz

Übersetzung gepr.:

LEVEL METER (dB,dBm)

Pegelmesser (dB,dBm)

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERKE FÜR MEITVERKEHRS- UND KABELTECHNIK

S45034 - D354 - B302 - x - 7411

Blatt 2
Blätter

Eing.-Wahlschalter S1 INPUT SELECTOR SWITCH S1		
Stellg. POS	Eing. INPUT	Eing. Widerst. INPUT IMPEDANCE
1	koax COAX	mit Tastteiler WITH PROBE DIVIDER
2		Z
3		10 kΩ // 60pF
4	sym BAL	≥ 10 kΩ
5		Z

Z-Schalter S2 IMPEDANCE SWITCH S2	
Stellg. POS	Z/Ω
1	75
2	125
3	135
4	140
5	150
6	600

Stellg. POS	dB/dBm-Schalter S4 dB/dBm SWITCH S4
1	Spannungspegel dB VOLTAGE LEVEL dB (U_0 = 0,775 V)
2	Leistungspegel dBm POWER LEVEL dBm (P_0 = 1mW)

1) Prüffeldabgleich TEST ROOM ALIGNMENT
2) in D 634 enthalten CONTAINED IN D 634
3) Wert und Einbau bestimmt Prüf. VALUE AND MOUNTING IS DETERMINED IN TEST ROOM

Drucktaste PUSH BUTTON T2,3,4	T2 breitb. gedrückt WIDEBAND PUSHED				T3 sel. klirrarm gedrückt T3 SELECT LOW-DISTORTION PUSHED				T4 sel. rauscharm gedrückt T4 SELECT LOW-NOISE PUSHED			
Schalter S4 SWITCH S4	dB		dBm		dB		dBm		dB		dBm	
Eingang INPUT	sym. BAL	koax. COAX	sym. BAL	koax. COAX	sym. BAL	koax. COAX	sym. BAL	koax. COAX	sym. BAL	koax. COAX	sym. BAL	koax. COAX
Stellung POS	Meßbereichschalter S3 MEASURING RANGE SWITCH S3											
1	▼1		—	—	▼1		—	—	—	—	—	—
2	—	+20	—	—	—	—	—	—	—	+20	—	—
3	—	+10	—	+20	—	—	—	—	—	+10	—	+20
4	+20	0	—	+10	+20	0	—	+10	+20	0	—	+10
5	+10	-10	+20	0	+10	-10	+20	0	+10	-10	+20	0
6	0	-20	+10	-10	0	-20	+10	-10	-0	-20	+10	-10
7	-10	-30	0	-20	-10	-30	0	-20	-10	-30	0	-20
8	-20	-40	-10	-30	-20	-40	-10	-30	-20	-40	-10	-30
9	-30	-50	-20	-40	-30	-50	-20	-40	-30	-50	-20	-40
10	-40dB	-60	-30	-50	-40dB	-60	-30	-50	-40dB	-60	-30	-50
11	—	—	—	—	-50	-70	-40	-60	-50	-70	-40	-60
12	—	—	—	—	-60	-80	-50	-70	-60	-80	-50	-70
13	—	—	—	—	-70	-90	-60	-80	—	—	—	—
14	—	—	—	—	-80	-100	-70	-90	—	—	—	—
15	—	—	—	—	-90	-110	-80	-100	—	—	—	—
16	—	—	—	—	-100	-120	-90	-110	—	—	—	—
17												
18												
19												
20					Dynamikausgang, Eingang koaxial, dB LARGE AMPL. SWING, INPUT							
21												dBm
22												symmetrisch, dB
23												dBm

Eingang koaxial INPUT COAXIAL Bu1

Eingang symmetrisch INPUT BAL Bu2

Eingangsbaugruppe INPUT SUBASSEMBLY S45035-D631-A101

S45035-D630-B301 enthält: CONTAINS:

Eingangsbaugruppe INPUT SUBASSEMBLY	S45035-D631-A101
Eingangswahlschalter S1 INPUT SELECTOR SWITCH S1	S45035-D632-A701
Z-Schalter S2 IMPEDANCE SWITCH	S45035-D633-A701
Meßbereichschalter S3 MEASURING RANGE SWITCH S3	S45035-D634-B101
Trennstufe BUFFER STAGE	S45035-D635-A101
Vorverstärker PREAMPLIFIER	S45035-D636-A101
Relaisplatte RELAY BOARD	S45035-D637-A101

ohne Baugr. Umgrenzung WITHOUT SUBASSEMBLY LIMITING

Trennstufe BUFFER STAGE S45035-D635-A101

Vorverstärker PREAMPLIFIER S45035-D636-A101

Relaisplatte RELAY BOARD S45035-D637-A101

Meßfeld MEASURING FIELD S45035-D630-B301

T2 breitbandig WIDEBAND

T3 selektiv klirrarm gedrückt SELECTIVE LOW-DISTORTION PUSHED

T4 selektiv rauscharm SELECTIVE LOW NOISE

Gleichspannungen mit µA-Multizet 50kΩ/V gemessen eingespeister Pegel bei 0-dB-Anzeige an Instrument S1: koax, S3 0dB, S4: dB (U_0=0,775V), S5: 40 Hz, T4 gedrückt, P2 in Mittelstellung, f_1 = 100 kHz gerastet, f_2 = 0 Hz gerastet

DC VOLTAGES MEASURED WITH µA-Multizet Meter OF 50 kΩ/V INJECTED LEVEL AT 0-dB INDICATION ON THE INSTRUMENT S1: COAX, S3 0dB, S4: dB (U_0=0,775V), S5: 40Hz, T4 PUSHED, P2 IN MID-POSITION, f_1 = 100 kHz WITH SPECTRUM LOCK-IN, f_2 = 0 Hz WITH SPECTRUM LOCK-IN

W231 W518 Z~0/R~0

Meßschaltung Pegelsender MEASURING CIRCUIT LEVEL OSCILLATOR

2N2218 2N2219

-50dB -40dB Eichpegel CALIBRATING LEVEL

Übers. gepr.

LEVEL METER (dB,dBm)

Pegelmesser (dB,dBm)

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR MEßTECHNIK UND BAUELEMENTE

S45034-D354-B302-x-7411

Blatt 1

Hauptmodulator MAIN MODULATOR S45035-D642-A701 Platte 1 BOARD 1

Eichoszillator CALIBRATING OSCILLATOR S45035-D641-B101

Umsetzer 2,4 MHz – 100 kHz CONVERTER 2,4 MHz-100 kHz S45035-D643-A101 Platte 3 BOARD 3

S45034-D354-B302-x-7411 Bl.3 SHEET 3

100-kHz-Filter 100-kHz FILTER S45035-D646-B101

Quarzfilter II CRYSTAL FILTER II S45035-D645-A701

Quarzfilter I CRYSTAL FILTER I S45035-D644-A701

Ausgang Dynamik OUTPUT LARGE AMPL SWING ZF 100 kHz Bu4

Schalter S5 SWITCH

Stellg. POS	Durchlaßbreite Δa ≤ 0,5 dB PASS-BAND	Bandbreite Δa = 3dB BANDWIDTH
1	10 Hz	~ 20 Hz
2	40 Hz	~ 80 Hz
3	1600 Hz	~ 3,1 kHz

Oszillator I OSCILLATOR I D 369

x) Prüffeldabgleich TEST ROOM ALIGNMENT

Oszillator II OSCILLATOR II D 370

Übersetzung gepr.:

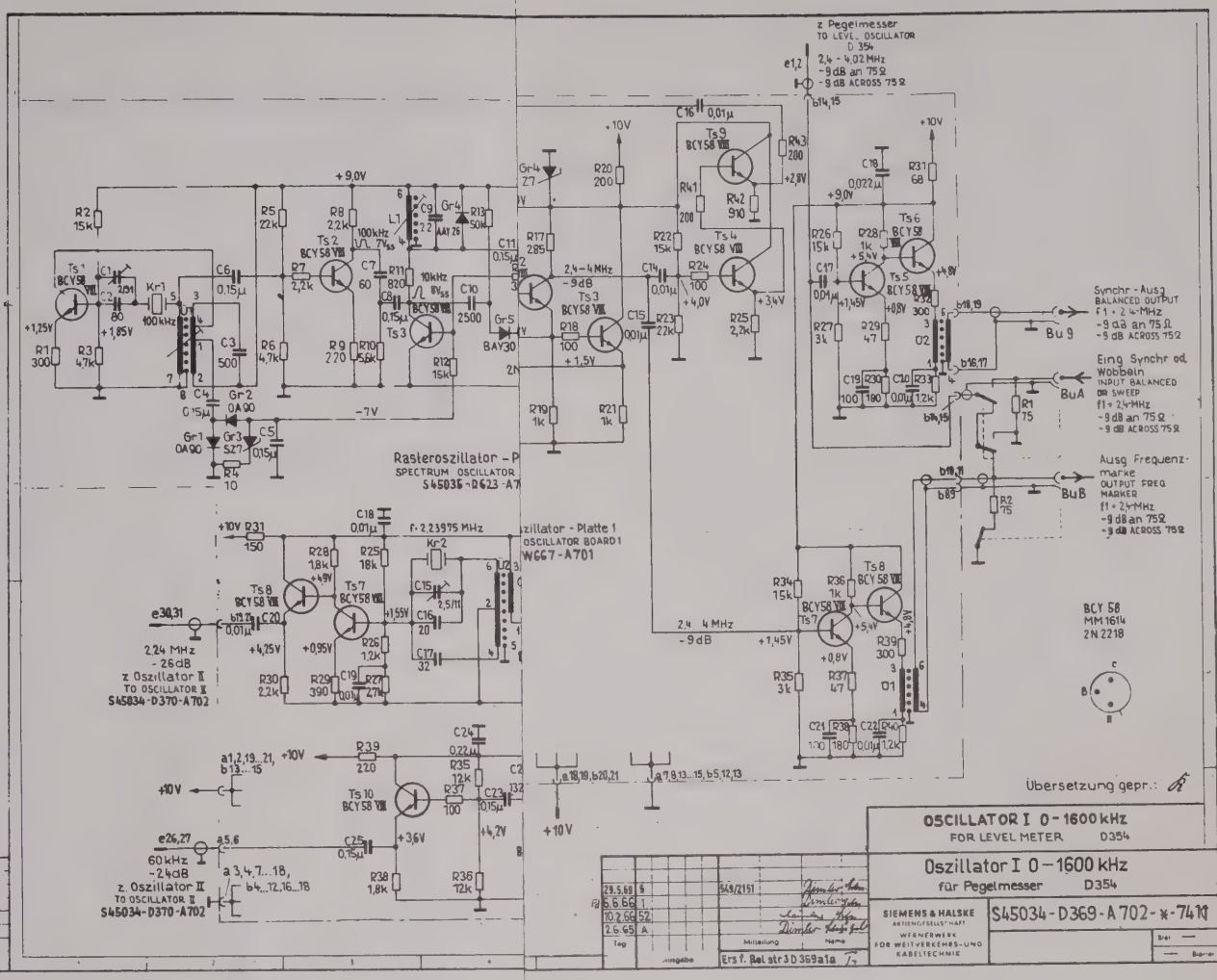
LEVEL METER (dB,dBm)

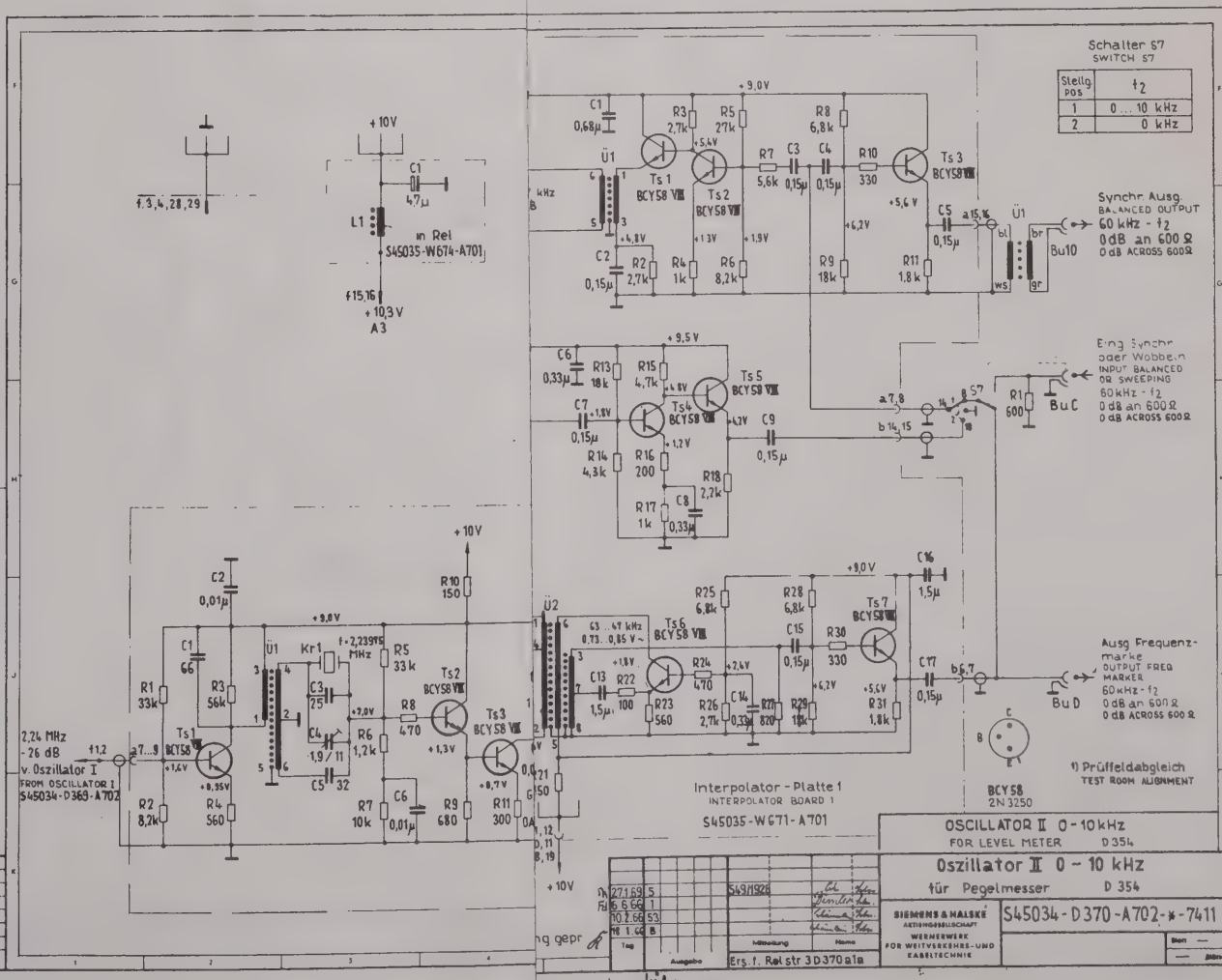
Pegelmesser (dB,dBm)

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR MEßTECHNIK UND BAUELEMENTE

S45034-D354-B302-x-7411

Blatt 2


z Pegelmesser
TO LEVEL OSCILLATOR
D 354
2,4 - 4,02 MHz
-9 dB an 75 Ω
-9 dB ACROSS 75 Ω
Synchr - Ausg
BALANCED OUTPUT
f1 ÷ 2,4 MHz
-9 dB an 75 Ω
-9 dB ACROSS 75 Ω
Bu 9
Eing Synchr od. Wobbeln
INPUT BALANCED OR SWEEP
f1 ÷ 24 MHz
-9 dB an 75 Ω
-9 dB ACROSS 75 Ω
BuA
Ausg Frequenzmarke
OUTPUT FREQ MARKER
f1 ÷ 24 MHz
-9 dB an 75 Ω
-9 dB ACROSS 75 Ω
BuB
BCY 58
MM 1614
2N 2218
Rasteroszillator - P
SPECTRUM OSCILLATOR
S45035-D623-A7
Oszillator - Platte 1
OSCILLATOR BOARD 1
W667-A701
2,24 MHz
- 26 dB
z Oszillator II
TO OSCILLATOR II
S45034-D370-A702
60 kHz
-24 dB
z. Oszillator II
TO OSCILLATOR II
S45034-D370-A702
2,4 4 MHz
-9 dB
Übersetzung gepr.:
OSCILLATOR I 0 - 1600 kHz
FOR LEVEL METER D354
Oszillator I 0 - 1600 kHz
für Pegelmesser D354
SIEMENS & HALSKE
AKTIENGESELLSCHAFT
WERNERWERK
FÜR WEITVERKEHRS- UND KABELTECHNIK
S45034-D369-A702-*-7411
Ers. f. Rel. str 3 D 369 a 1a


Schalter S7
SWITCH S7
Stellg. Pos
f2
1
0 ... 10 kHz
2
0 kHz
Synchr Ausg.
BALANCED OUTPUT
60 kHz - f2
0 dB an 600 Ω
0 dB ACROSS 600 Ω
Bu10
Eing Synchr oder Wobbeln
INPUT BALANCED OR SWEEPING
60 kHz - f2
0 dB an 600 Ω
0 dB ACROSS 600 Ω
BuC
Ausg Frequenzmarke
OUTPUT FREQ MARKER
60 kHz - f2
0 dB an 600 Ω
0 dB ACROSS 600 Ω
BuD
1) Prüffeldabgleich
TEST ROOM ALIGNMENT
BCY 58
2N 3250
2,24 MHz
- 26 dB
v. Oszillator I
FROM OSCILLATOR I
S45034-D369-A702
Interpolator - Platte 1
INTERPOLATOR BOARD 1
S45035-W671-A701
OSCILLATOR II 0 - 10 kHz
FOR LEVEL METER D354
Oszillator II 0 - 10 kHz
für Pegelmesser D 354
SIEMENS & HALSKE
AKTIENGESELLSCHAFT
WERNERWERK
FÜR WEITVERKEHRS- UND KABELTECHNIK
S45034-D370-A702-*-7411
Ers. f. Rel. str 3 D 370 a 1a

Rasteroszillator - Platte 3
SPECTRUM OSCILLATOR BOARD 3
S45035-D623-A701

Rasteroszillator - Platte 2
SPECTRUM OSCILLATOR BOARD 2
S45035-W668-A701

Rasteroszillator - Platte 1
SPECTRUM OSCILLATOR BOARD 1
S45035-W667-A701

Rast Kontr.
SPECTRUM CHECK
Sz 1

in S45035-W670-A701

Stellg. POS	Schalter S6 SWITCH S6
1	gerastet n x 10 kHz LOCKED TO
2	stetig UNLOCKED

1) Prüffeldabgleich
TEST ROOM ALIGNMENT

Übersetzung geprüft:

OSCILLATOR I 0 - 1600 kHz
FOR LEVEL METER D354

Oszillator I 0 - 1600 kHz
für Pegelmesser D354

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR MEßTECHNIK UND KABELTECHNIK

S45034-D369-A702-x-7411

Ers. f. Bau str 3 D 369 a1a

Schalter S7
SWITCH S7

Stellg. POS	f_2
1	0 10 kHz
2	0 kHz

Interpolator - Platte 2
INTERPOLATOR BOARD 2
S45035-W672-A701

Interpolator - Platte 3
INTERPOLATOR BOARD 3
S45035-D627-A701

Interpolator - Platte 1
INTERPOLATOR BOARD 1
S45035-W671-A701

f_2-Indikator
f_2-INDICATOR

BCY58
2N3250

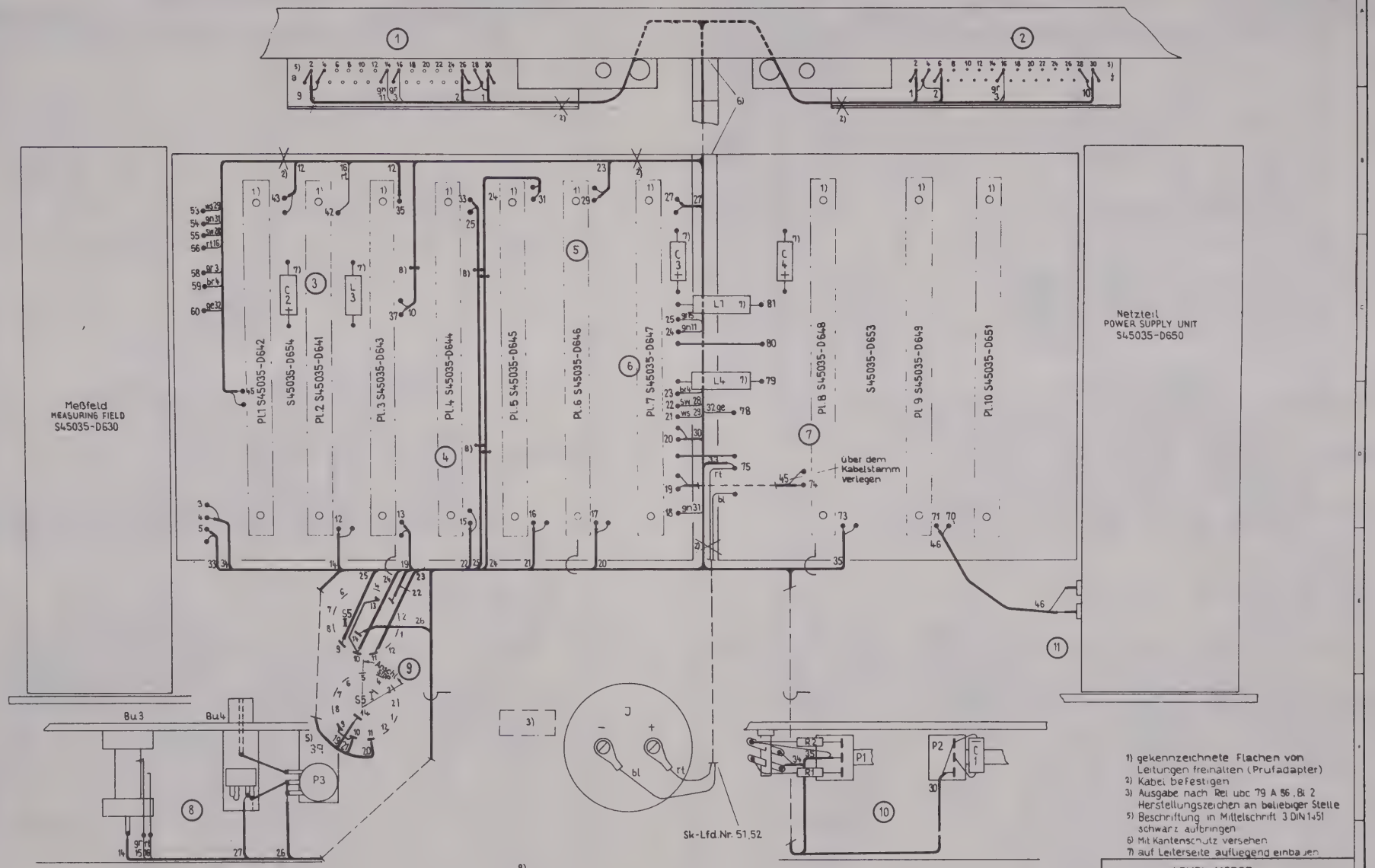
OSCILLATOR II 0 - 10 kHz
FOR LEVEL METER D354

Oszillator II 0 - 10 kHz
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR MEßTECHNIK UND KABELTECHNIK

S45034-D370-A702-x-7411

Ers. f. Bau str 3 D 370 a1a



1) gekennzeichnete Flächen von Leitungen freinalten (Prufadapter)
2) Kabel befestigen
3) Ausgabe nach Rel ubc 79 A 86 , Bl 2 Herstellungszeichen an beliebiger Stelle
5) Beschriftung in Mittelschrift 3 DIN 1451 schwarz aufbringen
6) Mit Kantenschutz versehen
7) auf Leiterseite aufliegend einbauen

LEVEL METER

Pegelmesser -B302-

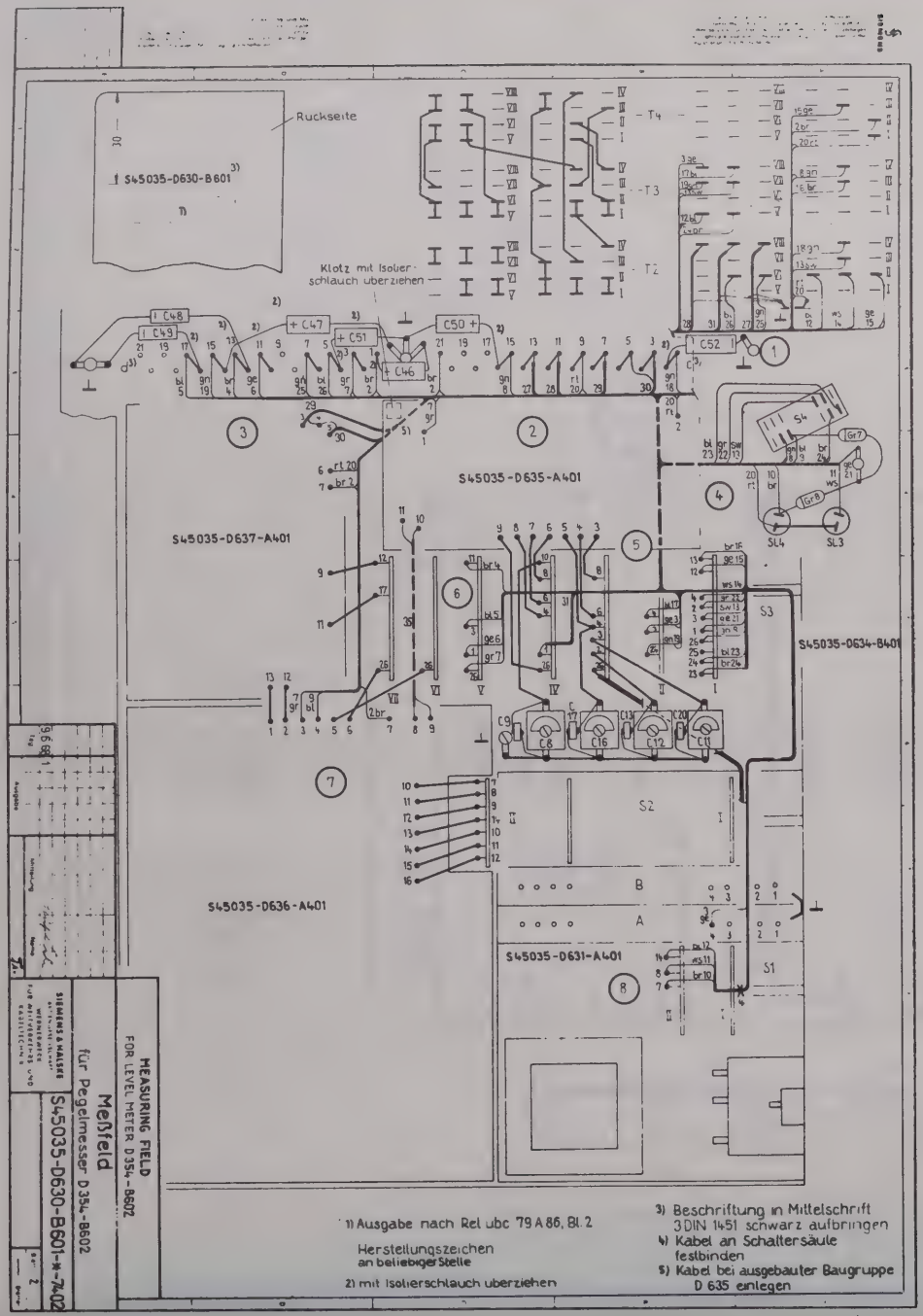
SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS UND KABELTECHNIK

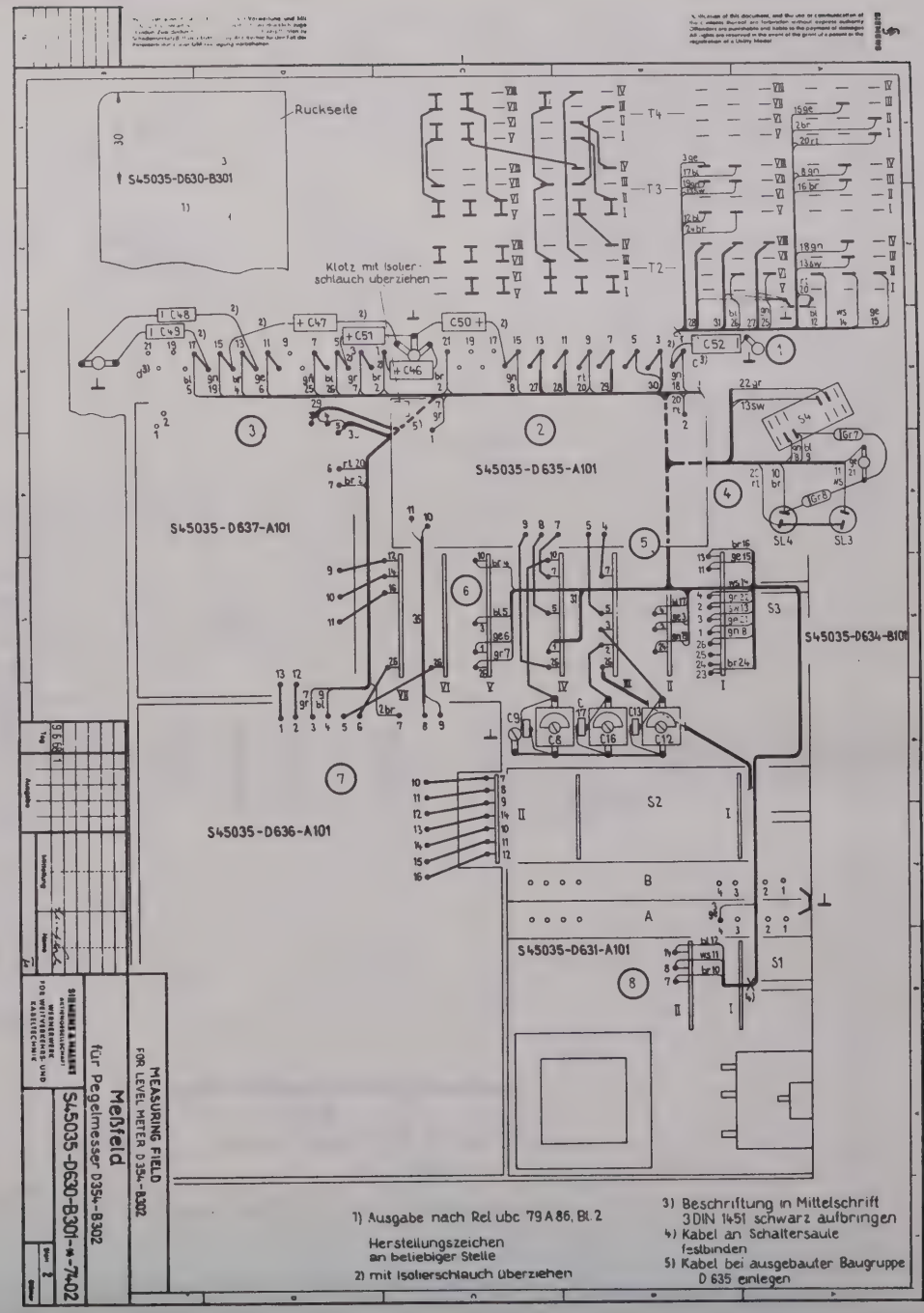
S45034-D354-B602-*-7407

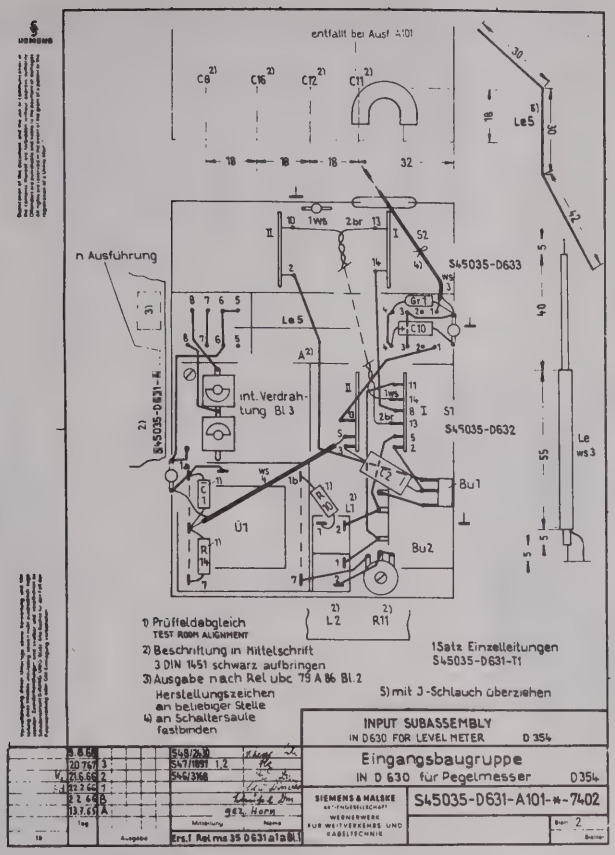
9.6.68 1
Tag Ausgabe

Bearb. Name

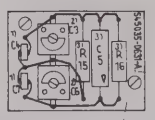
Blatt 2


Rückseite
S45035-D630-B601
Klotz mit Isolierschlauch überziehen
S45035-D635-A401
S45035-D637-A401
S45035-D636-A401
S45035-D631-A401
S45035-D634-B401
T4
T3
T2
S1
S2
S3
S4
SL3
SL4
MEASURING FIELD FOR LEVEL METER D354-B602
Meßfeld für Pegelmesser D354-B602
S45035-D630-B601-*-7402
1) Ausgabe nach Rel ubc 79 A 86, Bl. 2
Herstellungszeichen an beliebiger Stelle
2) mit Isolierschlauch überziehen
3) Beschriftung in Mittelschrift DIN 1451 schwarz aufbringen
4) Kabel an Schaltersäule festbinden
5) Kabel bei ausgebauter Baugruppe D 635 einlegen


Rückseite
S45035-D630-B301
Klotz mit Isolierschlauch überziehen
S45035-D635-A101
S45035-D637-A101
S45035-D636-A101
S45035-D631-A101
S45035-D634-B101
T4
T3
T2
S1
S2
S3
S4
SL3
SL4
MEASURING FIELD FOR LEVEL METER D354-B302
Meßfeld für Pegelmesser D354-B302
S45035-D630-B301-*-7402
1) Ausgabe nach Rel ubc 79 A 86, Bl. 2
Herstellungszeichen an beliebiger Stelle
2) mit Isolierschlauch überziehen
3) Beschriftung in Mittelschrift DIN 1451 schwarz aufbringen
4) Kabel an Schaltersäule festbinden
5) Kabel bei ausgebauter Baugruppe D 635 einlegen

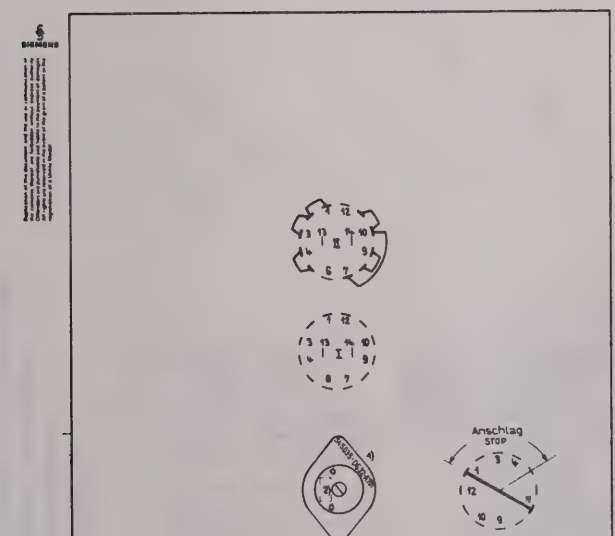


		INPUT SUBASSEMBLY IN D630 FOR LEVEL METER D 354	
		Eingangsbaugruppe IN D 630 für Pegelmesser D 354	
5.8.68	548/2430	SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERKE FÜR WEITVERKEHRS- UND KABELTECHNIK	S45035-D631-A101-*-7402
20.7.67 3	547/1897 1,2		
21.6.66 2	546/3168		
22.2.66 1			
13.7.65 A			Blatt 2
Tag / Ausgabe	Mitteilung / Name	Ers. f. Rel. ms 35 D 631 a 1 a Bl. 1	Berlin

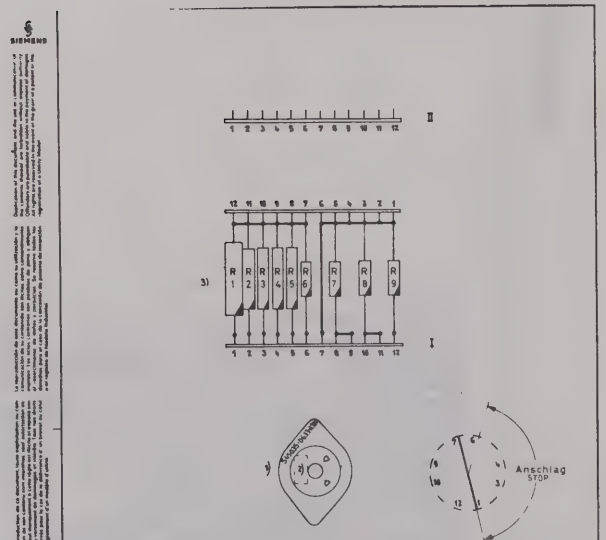


1) Prüffeldabgleich
TEST ROOM ALIGNMENT
2) Beschriftung in Mittelschrift 2,5 DIN 1451 schwarz aufbringen
3) auf HP Platte auflliegend einbauen

		INPUT SUBASSEMBLY IN D630 FOR LEVEL METER D 354	
		Eingangsbaugruppe in D630 für Pegelmesser D 354	
5.8.68	548/2430	SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERKE FÜR WEITVERKEHRS- UND KABELTECHNIK	S45035-D631-A101-*-7402
20.7.67	547/1897		
22.2.66 1			
Tag / Ausgabe	Mitteilung / Name	Ers. f. Rel. ms 35 D 631 a 1 a Bl. 2	Blatt 3

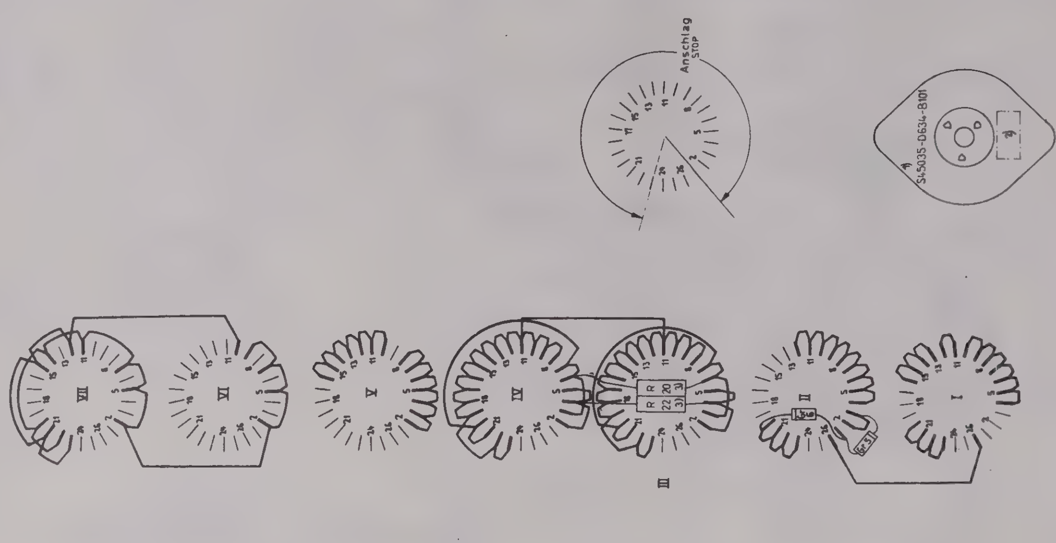


		INPUT SELECTOR SWITCH S1 IN D630-B602 302 FOR LEVEL METER D 354	
		Eingangswahlschalter S1 in D 630-B602, 302 für Pegelmesser D 354	
5.8.68	548/2430	SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERKE FÜR WEITVERKEHRS- UND KABELTECHNIK	S45035-D632-A701-*-7402
20.7.67	547/1897		
22.2.66 1			
13.7.65 A			Blatt —
Tag / Ausgabe	Mitteilung / Name	Ers. f. Rel. ms 35 D 632 a 1 a	Berlin —



		IMPEDANCE SWITCH S2 IN D630-B602,302 FOR LEVEL METER D354	
		Z-Schalter S2 in D630-B602,302 für Pegelmesser D 354	
5.8.68	548/2430	SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERKE FÜR WEITVERKEHRS- UND KABELTECHNIK	S45035-D633-A701-*-7402
20.7.67	547/1897		
22.2.66 1			
18.1.66 B			Blatt —
13.7.65 A			Blätter —
Tag / Ausgabe	Mitteilung / Name	Ers. f. Rel. ms 35 D 633 a 1 a	

SIEMENS



1) Beschriftung in Mittelschrift
3 DIN 1451 schwarz aufbringen

2) Ausgabe nach Rel ubc 79 A 86, Bl. 2

Herstellungszeichen an beliebiger Stelle

3) Widerstände auf Schalterebenen aufliegend einbauen

Sämtl. Formdrähte so kurz als möglich

Brücken auf Innenseite der Schalterebenen einbauen

1 Satz Formdrähte S45035-D634-T2

Tag	Ausgabe	Mitteilung	Name
15.11.68	2	S49 1784	
9.6.68	1		

LEVEL RANGE SWITCH S3
IN D 630-B301 FOR LEVEL METER D354-B302

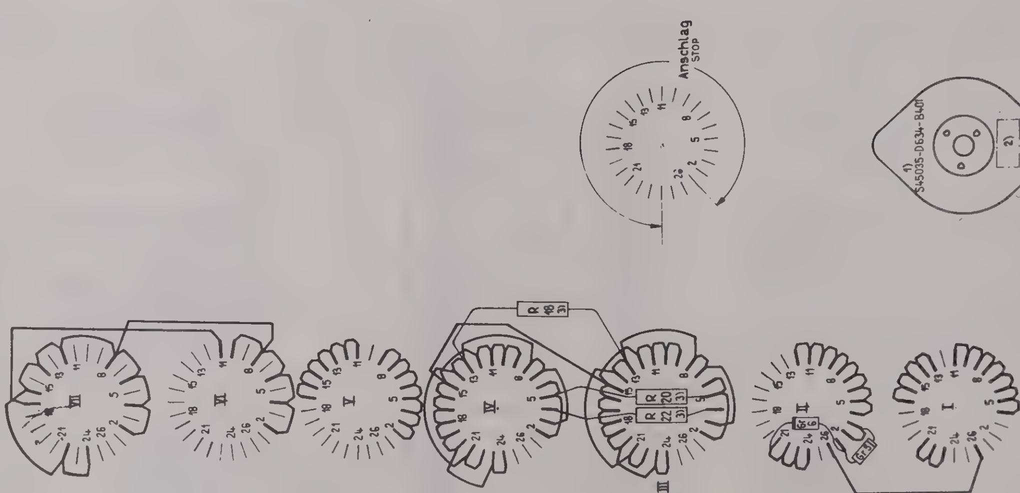
Meßbereichschalter S3
in D 630-B301 für Pegelmesser D354-B302

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D634-B101-*-7402

Blatt — Blätter

SIEMENS



1) Beschriftung in Mittelschrift
3 DIN 1451 schwarz aufbringen

2) Ausgabe nach Rel ubc 79 A 86, Bl. 2

Herstellungszeichen an beliebiger Stelle

3) Widerstände auf Schalterebenen aufliegend einbauen

Sämtl. Formdrähte so kurz als möglich

Brücken auf Innenseite der Schalterebenen einbauen

Satz Formdrähte S45035-D634-T1

Tag	Ausgabe	Mitteilung	Name
15.11.68	2	S49 1784	
9.6.68	1		

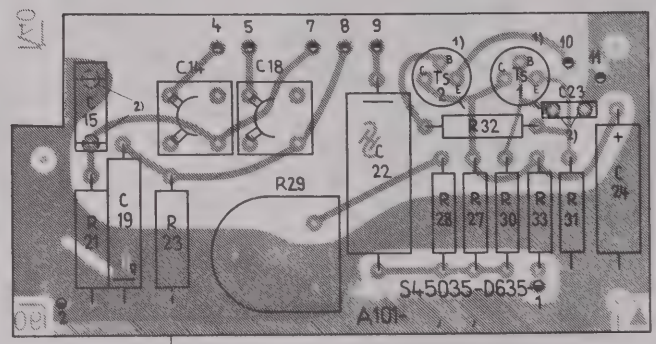
LEVEL RANGE SWITCH S3
IN D 630-B601 FOR LEVEL METER D354-B602

Meßbereichschalter S3
in D 630-B601 für Pegelmesser D354-B602

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D634-B401-*-7402

Blatt — Blätter



Lötstift Sk-Lfd.Nr. 69
Einbaulage beachten

1) Sk-Lfd.Nr. 65

2) Isolierperle Sk-Lfd.Nr. 61

S45035-D635-U2

Tag	Ausgabe	Mitteilung	Name
9.6.68	3	S48/2438	
20.7.67	2	S47/1897	
22.2.66	1		
16.2.66	C		
31.1.66	B		
13.7.65	A	gez. Schüssel/Dm	
		Ers.f. Rel ms 35D635a2a 75.	

31.1.66 Kg

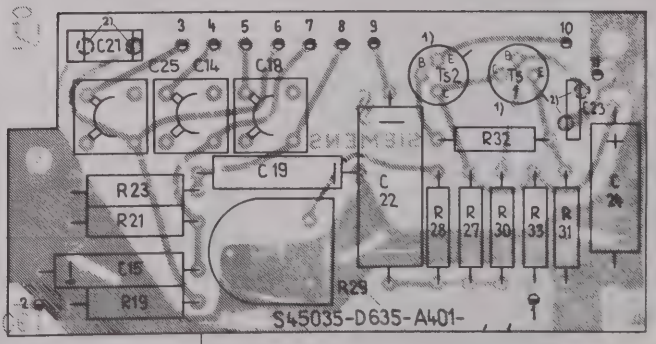
BUFFER STAGE
FOR LEVEL METER D 354

Trennstufe
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D635-A101-*-7402

Blatt
Blätter



Lötstift Sk-Lfd.Nr. 69
Einbaulage beachten

1) Sk-Lfd.Nr. 65

2) Isolierperle Sk-Lfd.Nr. 61

S45035-D635-U1

Tag	Ausgabe	Mitteilung	Name
9.6.68	4	S48/2438	
20.7.67	3	S47/1897	
21.5.66	2	S46/3168	
22.2.66	1		
2.2.66	B		
		Ers.f. Rel ms 35 D635a1a/2	

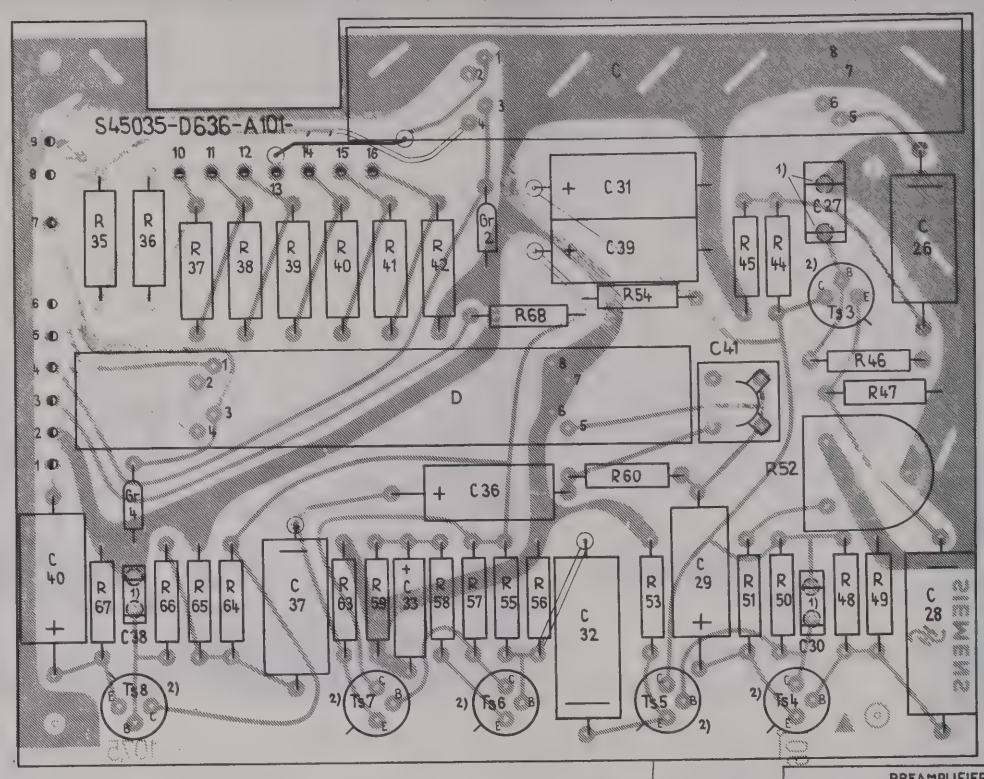
BUFFER STAGE
FOR LEVEL METER D 354

Trennstufe
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D635-A401-*-7402

Blatt
Blätter



S45035-D636-U2

1) Isolierperle Sk-lfd.Nr. 101

2) Sk-lfd.Nr. 102

Lötstift Sk-lfd.Nr.104
Einbaulage beachten

Tag	Ausgabe	Mitteilung	Name
9.6.68	3	548/2430	
20.7.67	2	547/1897	
21.6.66	2	546/3168	
22.2.66	1		
18.1.66	B		
13.7.65	A		

Ers f Rel ms 35D636a2a

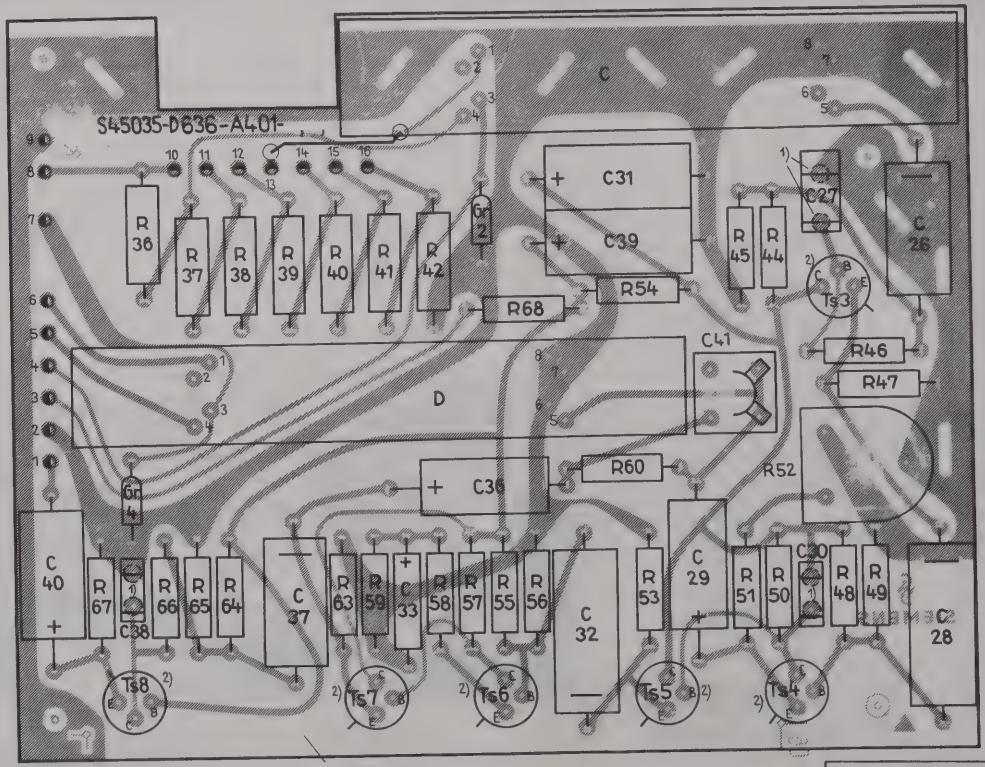
PREAMPLIFIER
FOR LEVEL METER D354

Vorverstärker
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D636-A101-*-7402

Blatt —
— Blätter



S45035-D636-U1

1) Isolierperle Sk-lfd.Nr. 101

2) Sk-lfd.Nr. 102

Lötstifte Sk-lfd.Nr.104
Einbaulage beachten

Tag	Ausgabe	Mitteilung	Name
9.6.68	3	548/2430	
20.7.67	2	547/1897	
21.6.66	2	546/3168	
22.2.66	1		
2.2.66	B		

Ers f Rel ms 35D636a1a

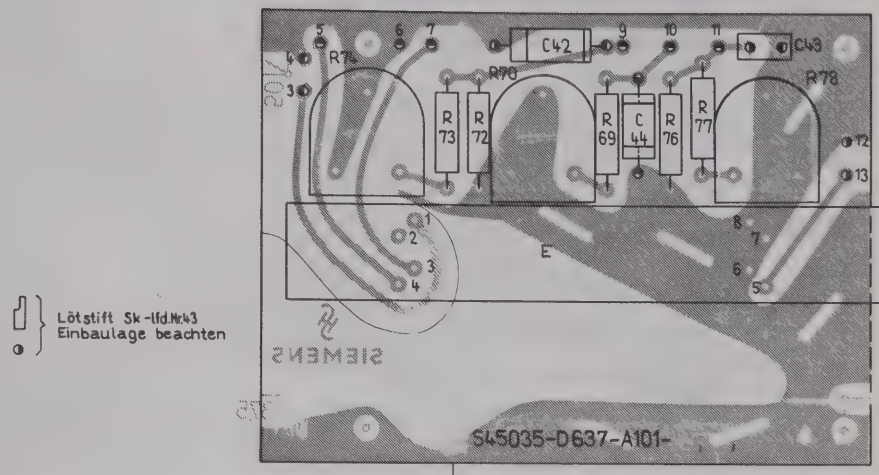
PREAMPLIFIER
FOR LEVEL METER D354

Vorverstärker
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D636-A401-*-7402

Blatt —
— Blätter



Lötstift Sk-lfd.Nr.43
Einbaulage beachten

S45035-D637-U2

Tag	Ausgabe	Mitteilung	Name
9.6.66	3	548/2430	
20.7.67	2	547/1897	
22.2.66	1		
16.2.66	C		
31.1.66	B		
13.7.65	A	gez. Schußel/Dm	

Fd. — Ers. f. Rel. ms 35 D637-a2a/4. 31.1.66

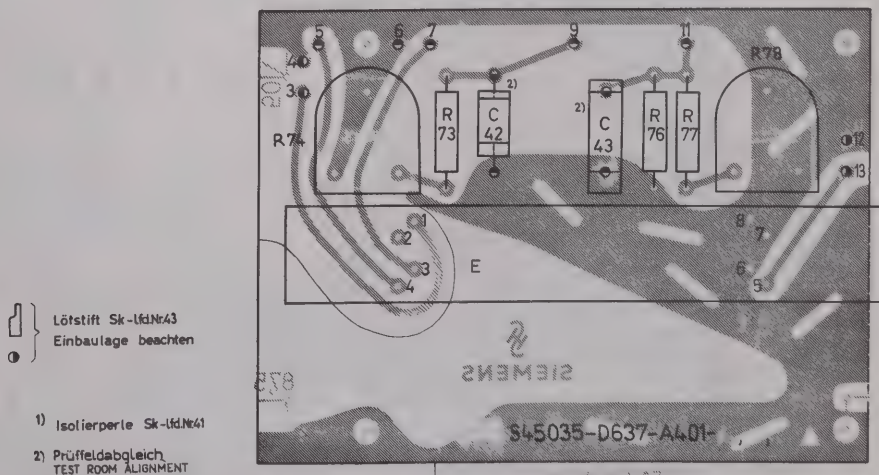
RELAY BOARD
FOR LEVEL METER D 354

Relaisplatte
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D637-A101-*-7402

Blatt —
Blätter —



Lötstift Sk-lfd.Nr.43
Einbaulage beachten

1) Isolierperle Sk-lfd.Nr.41

2) Prüffeldabgleich
TEST ROOM ALIGNMENT

S45035-D637-U1

Tag	Ausgabe	Mitteilung	Name
9.6.66	3	548/2430	
20.7.67	2	547/1897	
21.6.66	2	545/1766	
22.2.66	1		
16.2.66	C		
8.2.66	B		

Fd. — Ers. f. Rel. ms 35 D637-a1a/3.

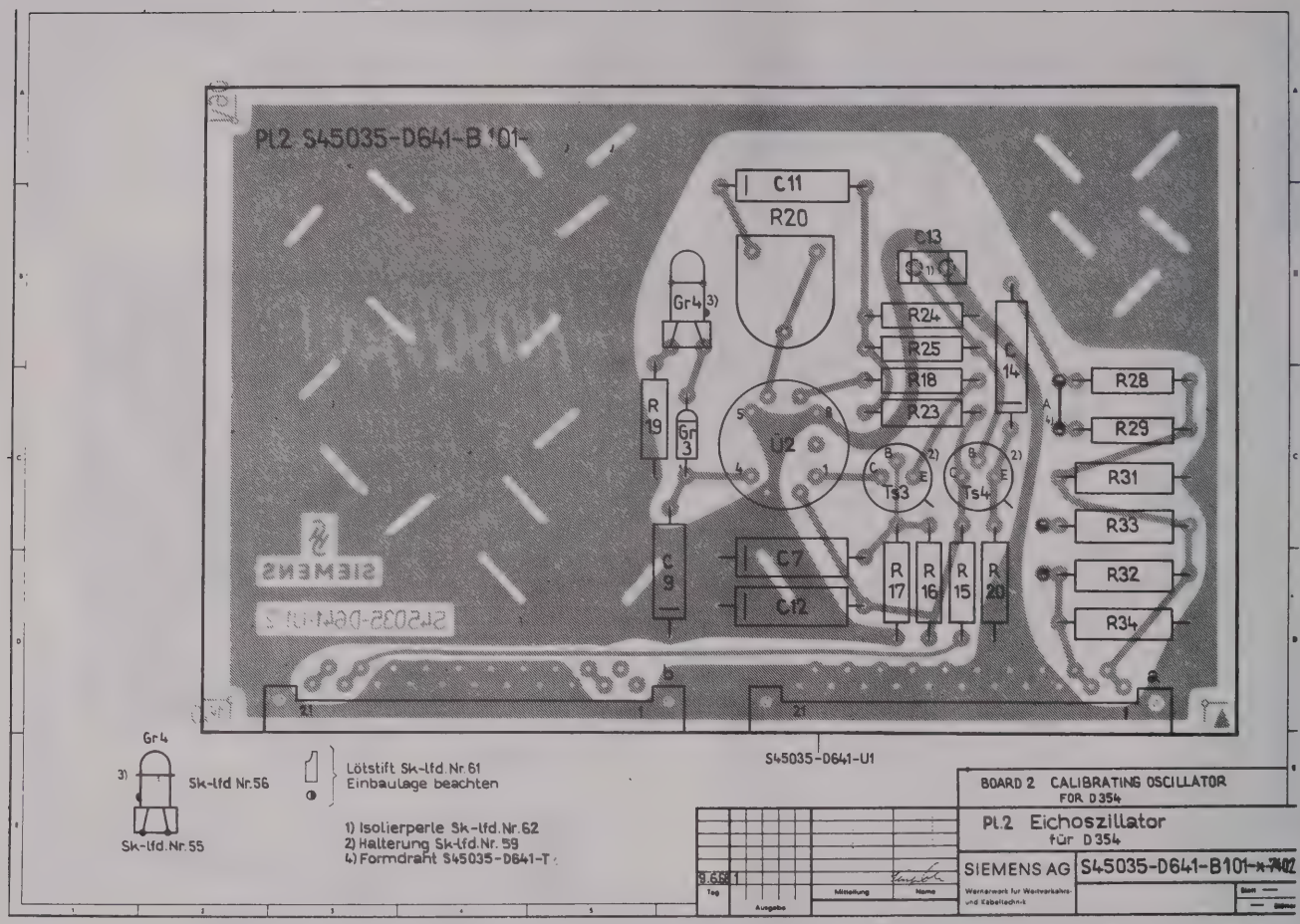
RELAY BOARD
FOR LEVEL METER D 354

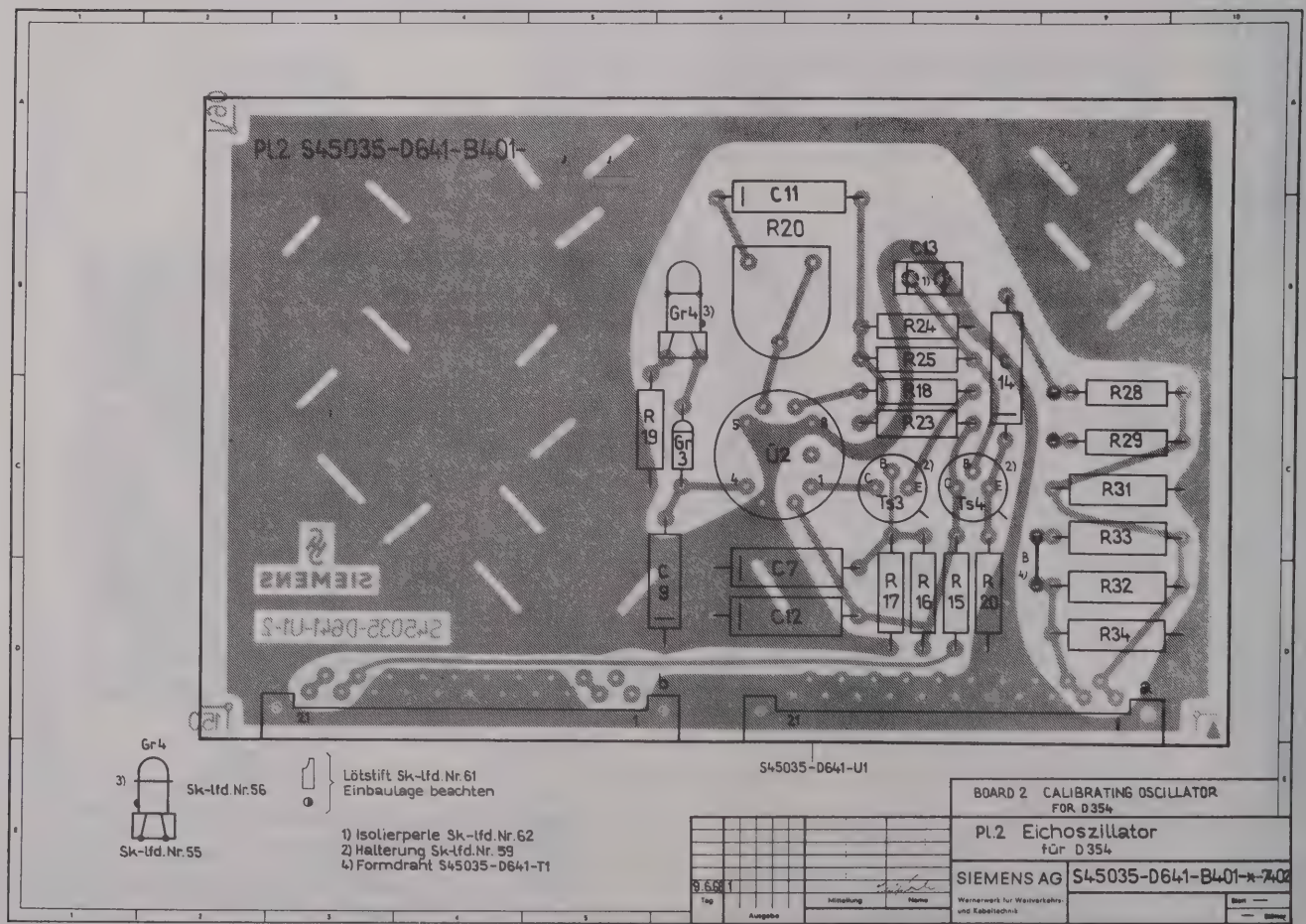
Relaisplatte
für Pegelmesser D 354

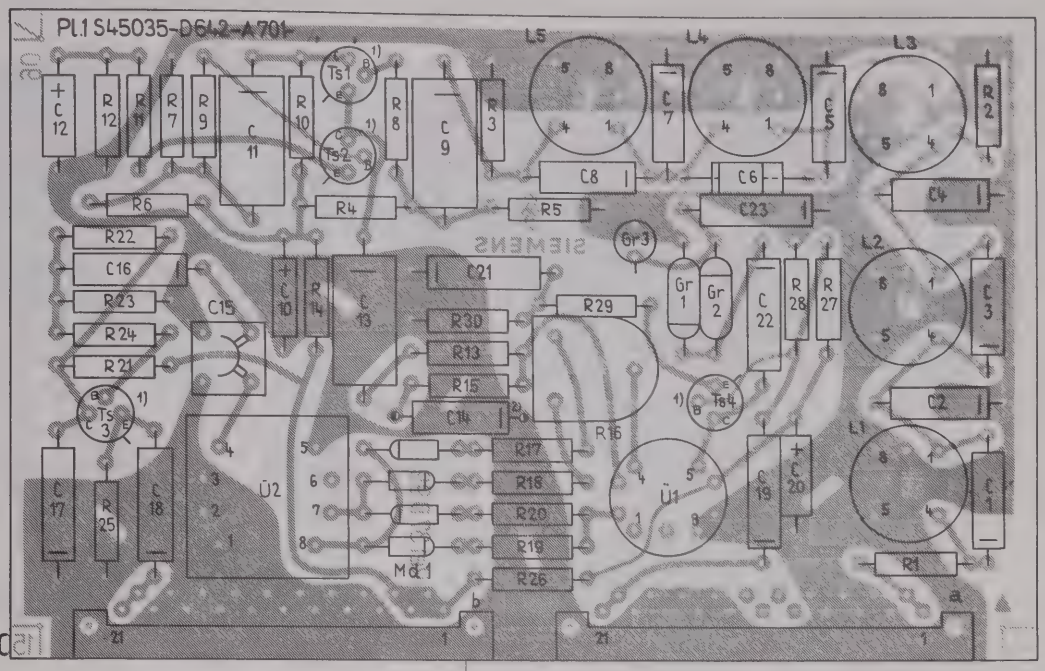
SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D637-A401-*-7402

Blatt —
Blätter —


PL2 S45035-D641-B101-
C11
R20
C13
Gr4
3)
R24
R25
R18
R23
C14
R28
R29
R31
R33
R32
R34
R19
Gr3
Ü2
Ts3
Ts4
2)
C9
C7
C12
R17
R16
R15
R20
SIEMENS
S45035-D641-U1-Z
Gr4
3)
Sk-lfd.Nr.56
Sk-lfd.Nr.55
Lötstift Sk-lfd.Nr.61
Einbaulage beachten
1) Isolierperle Sk-lfd.Nr.62
2) Halterung Sk-lfd.Nr.59
4) Formdraht S45035-D641-T1
S45035-D641-U1
BOARD 2 CALIBRATING OSCILLATOR
FOR D354
PL2 Eichoszillator
für D354
SIEMENS AG
S45035-D641-B101-x-7402
Werkerwerk für Weitverkehrs- und Kabeltechnik
Tag
Ausgabe
Mitteilung
Name


PL2 S45035-D641-B401-
C11
R20
C13
Gr4
3)
R24
R25
R18
R23
C14
R28
R29
R31
R33
R32
R34
R19
Gr3
Ü2
Ts3
Ts4
2)
C9
C7
C12
R17
R16
R15
R20
SIEMENS
S45035-D641-U1-Z
Gr4
3)
Sk-lfd.Nr.56
Sk-lfd.Nr.55
Lötstift Sk-lfd.Nr.61
Einbaulage beachten
1) Isolierperle Sk-lfd.Nr.62
2) Halterung Sk-lfd.Nr.59
4) Formdraht S45035-D641-T1
S45035-D641-U1
BOARD 2 CALIBRATING OSCILLATOR
FOR D354
PL2 Eichoszillator
für D354
SIEMENS AG
S45035-D641-B401-x-7402
Werkerwerk für Weitverkehrs- und Kabeltechnik
Tag
Ausgabe
Mitteilung
Name



S45035-D642-U1

Gr 3

Sk-lfd Nr. 94

1) Sk-lfd.Nr.88

2) Prüffeldabgleich
TEST ROOM ALIGNMENT

Lötstift
Sk-lfd.Nr.96
Einbaulage
beachten

Tag	Ausgabe	Änderungsmitteilung	Name
9.6.68	3	548/2430	
20.7.67	2	547/1897	
21.6.66	2	546/3168	
22.2.66	1		
1.2.66	B		
	A	gez	Schußel/Dm
		Ers f Rel ms 35 D 642 ala	

BOARD 1 MAIN MODULATOR
FOR LEVEL METER D 354

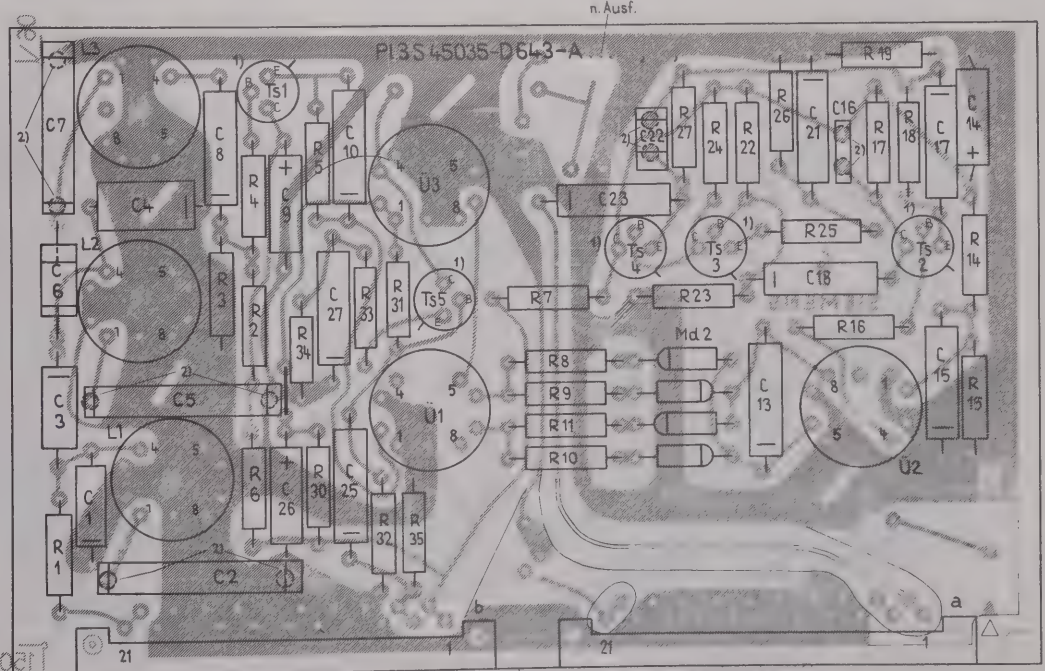
Pl.1 Hauptmodulator
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK
FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D642-A701-*-7402

Blatt —
Blätter —

n. Ausf.



S45035-D643-U1

1) Sk-lfd.Nr. 98

2) Isolierperle Sk-lfd.Nr. 100

Tag	Ausgabe	Änderungsmitteilung	Name
9.6.68	4	548/2430	
20.7.67	3	547/1897	
3.5.65	A	gez	Schußel/Dm
		Ers f Rel ms 35 D 643 ala	

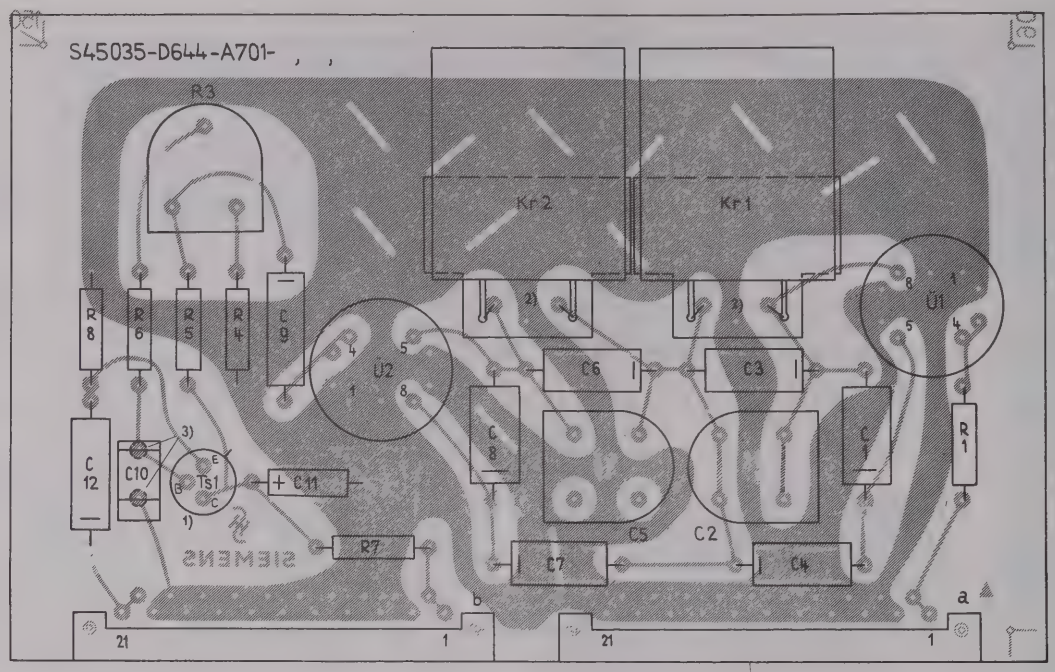
BOARD 3 CONVERTER 2,4 MHz/100 kHz
FOR LEVEL METER D 354

Pl.3 Umsetzer 2,4 MHz / 100 kHz
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK
FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D643-A 401/101 -*-7402

Blatt —
Blätter —



S45035-D644-U1

2) Anschlußdrähte der Fassung, der Skizze entsprechend ausformen Sk-lfd Nr. 54

1) Sk-lfd.Nr 58

3) Isolierperle Sk-lfd Nr. 68

Tag	Ausgabe	Mitteilung	Name
9.6.68	2	548/2430	
20.7.67	1	547/1897	
22.2.66	1		
31.1.66	B		
3.5.65	A		

Ers. f. Relms 35D644ala

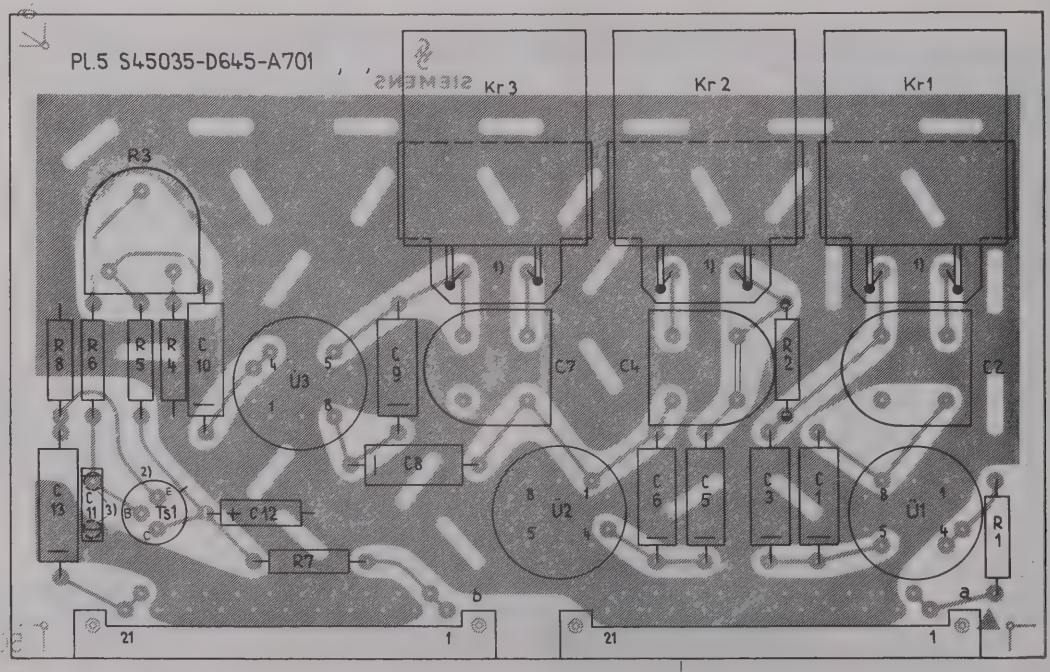
BOARD 4 CRYSTAL FILTER I
FOR LEVEL METER D 354

Pl.4 Quarz-Filter I
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D644-A701-*-7402

Blatt —
Blätter —



S45035-D645-U1

1) Anschlußdrähte der Fassung der Skizze entsprechend ausformen Sk-lfd Nr 54

2) Sk-lfd Nr 58

3) Isolierperle Sk-lfd Nr. 68

Lötstift Sk-lfd Nr 69 Einbaulage beachten

Tag	Ausgabe	Mitteilung	Name
9.6.68	3	548/2430	
20.7.67	2	547/1897	
21.6.66	2		
22.2.66	1		
31.1.66	B		
3.5.65	A		

Ers. f. Relms 35D645ala

BOARD 5 CRYSTAL FILTER II
FOR LEVEL METER D 354

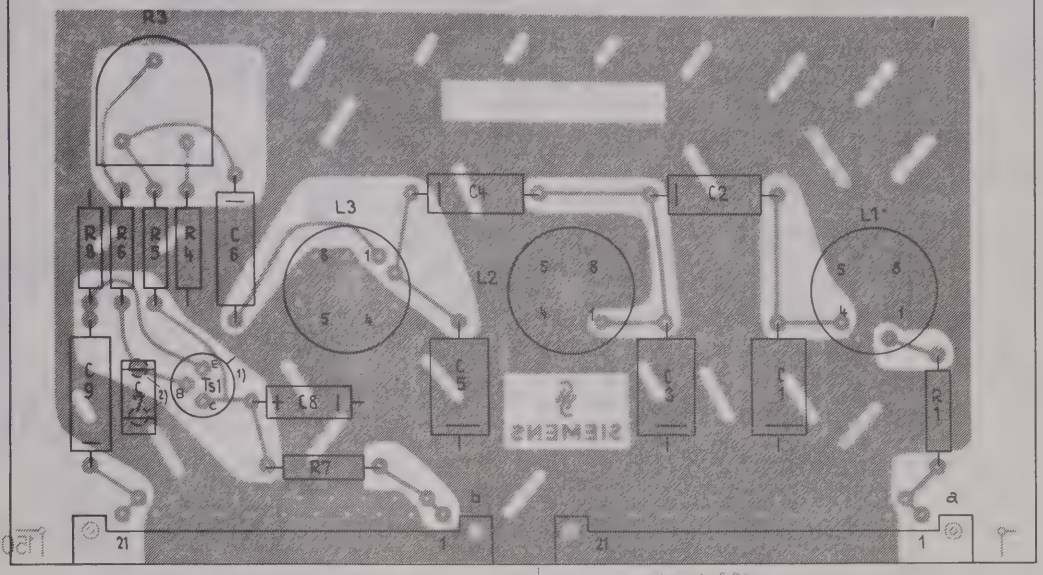
Pl.5 Quarz-Filter II
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D645-A701-*-7402

Blatt —
Blätter —

PL.6 S45035-D646-B701-



S45035-D646-U1

1) Sk-lfd Nr.45
2) Isolierperle Sk-lfd.Nr.51

BOARD 6 100-kHz-FILTER
FOR LEVEL METER D 354

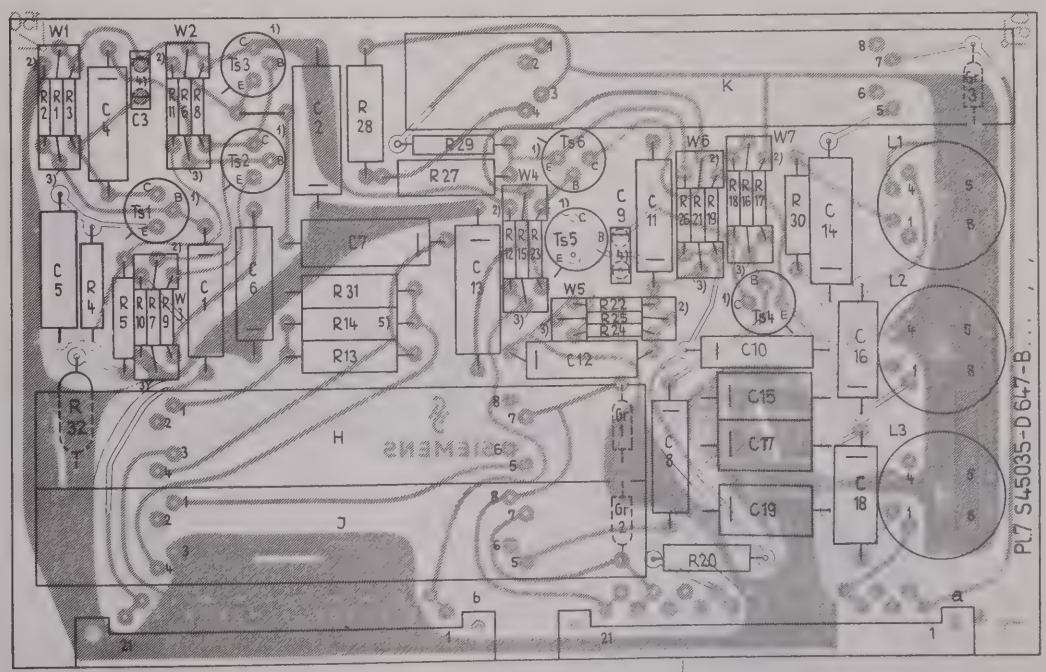
PL.6 100-kHz-Filter
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S 45035-D646-B701-*-7402

Blatt —
Blätter —

9.6.68.1 Tag | Ausgabe | Mitteilung | Name



PL.7 S45035-D647-B...

S45035-D647-U1

3) Einfädelseite

	W1	W2	W3	W4	W5	W6	W7
	R3	R8	R9	R23	R24	R19	R17
	R2	R11	R10	R12	R22	R26	R18
	R1	R6	R7	R15	R25	R21	R16

2) Sk-lfd Nr. 99

1) Sk-lfd.Nr.91
4) Isolierperle Sk-lfd.Nr.96
5) mit Isolierschlauch überziehen

BOARD 7 100-kHz-PREAMPLIFIER
FOR LEVEL METER D 354

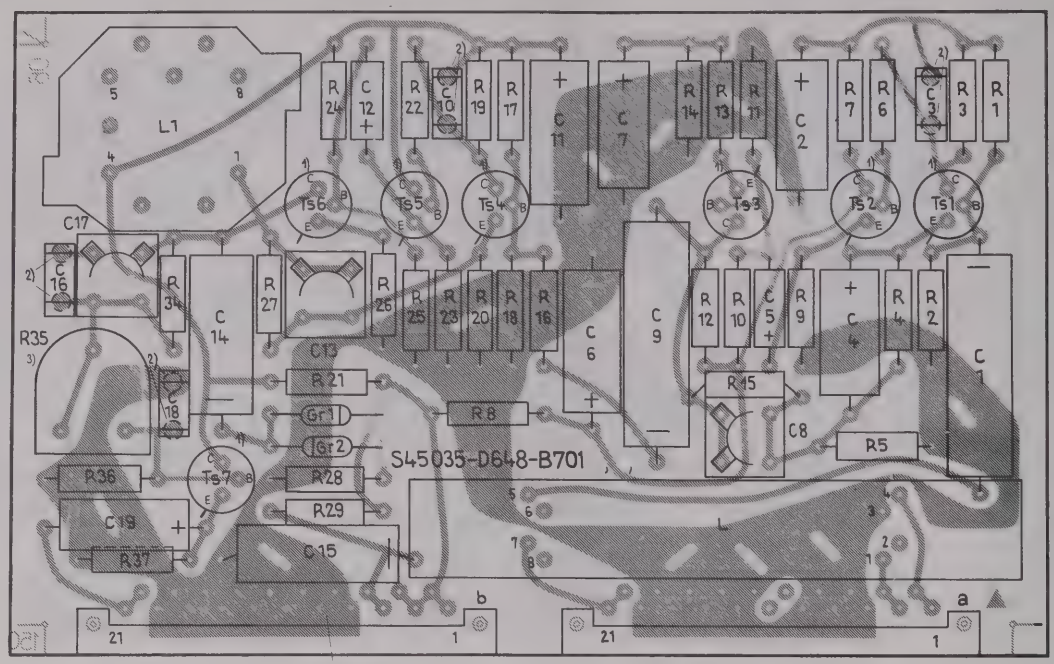
PL.7 100-kHz-Verstärker
für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D647-B[401/101]-*-7402

Blatt —
Blätter —

9.6.68.1 Tag | Ausgabe | Mitteilung | Name



1) Sk.-lfd.Nr.89
2) Sk.-lfd.Nr.94
3) Sk.-lfd.Nr.51

BOARD 8 WIDEBAND AMPLIFIER
FOR LEVEL METER D 354

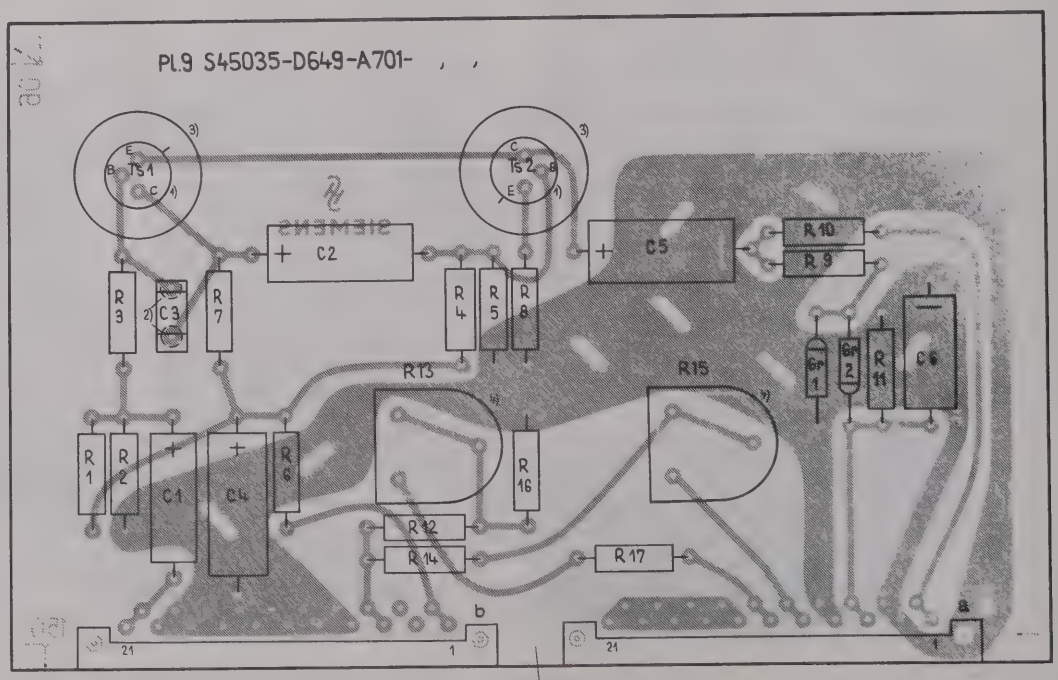
Pl.8 Breitbandverstärker
für Pegelmesser D354

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D648-B701-A-7402

Tag	Ausgabe	Mitteilung	Name
9.6.65	1		

Blatt —
Blätter —



1) Sk.-lfd.Nr.45
2) Sk.-lfd.Nr.63
3) Sk.-lfd.Nr.59
4) Sk.-lfd.Nr.30

BOARD 9 POWER AMPLIFIER AND DEMODULATOR
FOR LEVEL METER D 354

Leistungsverstärker u. Demodulator
Pl.9 für Pegelmesser D354

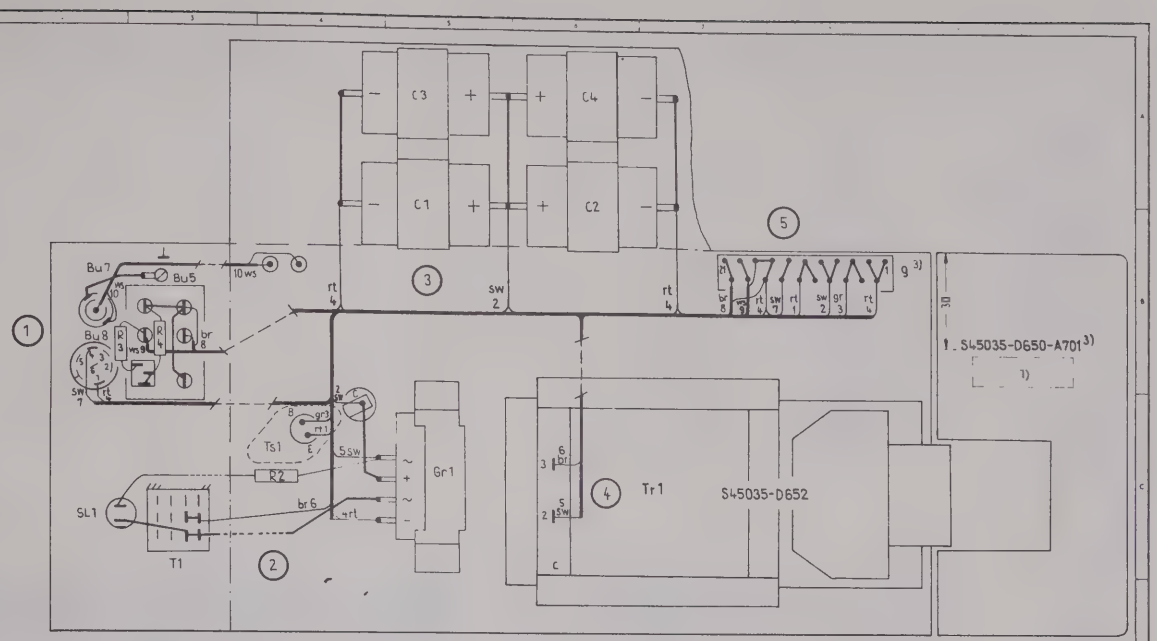
SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-D649-A701-A-7402

Tag	Ausgabe	Mitteilung	Name
9.6.65	2	548/2430	
20.7.67	1	547/1897	
27.7.66	1		
31.5.66	B		
3.5.65	A	gez. Schubert	

Ers f Relms 35 D649 a1a

Blatt —
Blätter —



1) Ausgabe nach Rel ubc 79 A 86, Bl 2

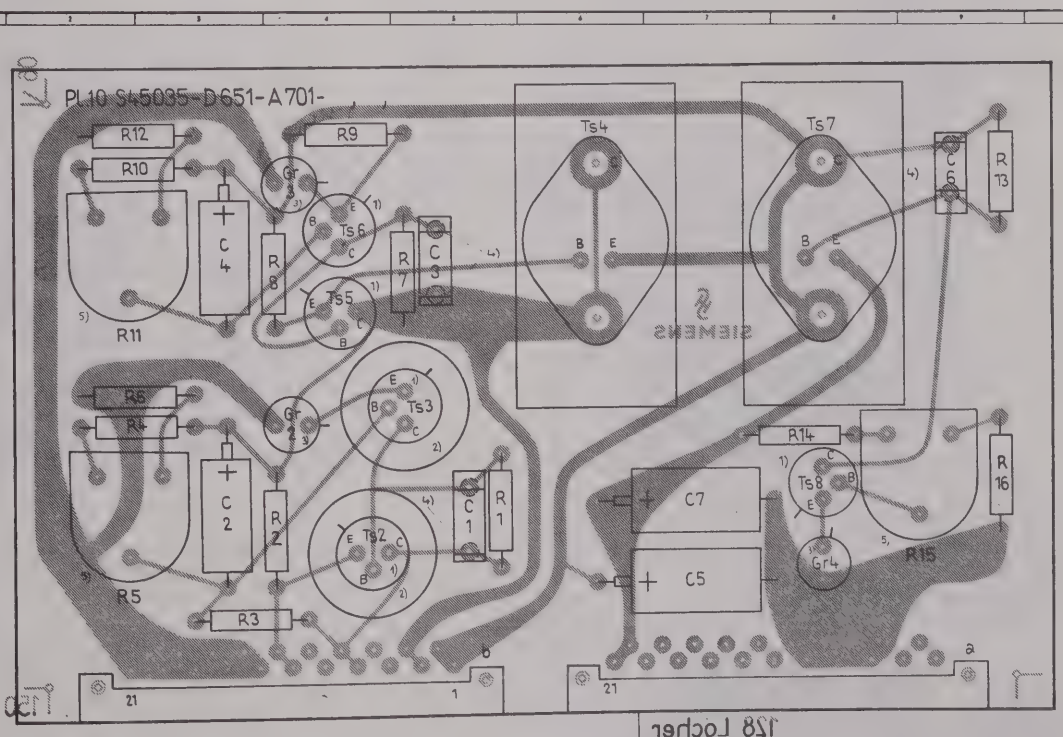
Herstellungszeichen an beliebiger Stelle

3) Beschriftung in Mittelschrift-3 DIN 1451 schwarz aufbringen

Tag	Ausgabe	Mitteilung	Name
3.6.68	4	S48/2430	
20.7.67	3	S47/1897	
21.6.66	2	S46/3168	
22.2.66	1		
23.1.66	B		
9.7.65	A		

Ers. f. Rel ms 35 D650 a1a

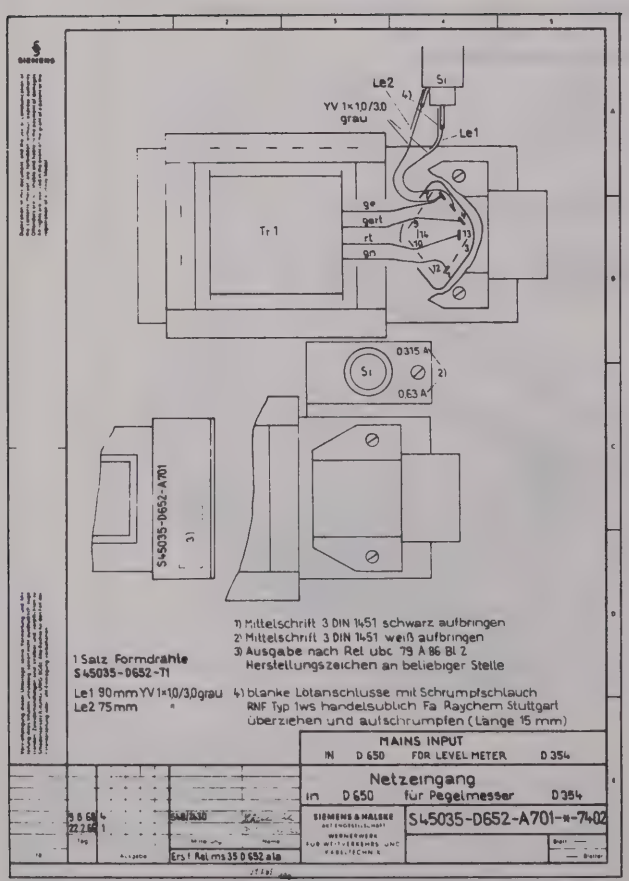
POWER SUPPLY UNIT I	
FOR LEVEL METER D354	
Netzteil I	
für Pegelmesser D 354	
SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK	S45035-D650-A701-*-7402
	Blatt 2 Blätter



Tag	Ausgabe	Mitteilung	Name
3.6.68	2	S48/2430	
20.7.67	1	S47/1897	
22.2.66	1		
31.1.66	B		
3.5.65			

Ers. f. Rel ms 35 D651 a1a

BOARD 10 POWER SUPPLY UNIT II	
FOR LEVEL METER D 354	
PL10 Netzteil II	
für Pegelmesser D354	
SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERKE FÜR WEITVERKEHRS- UND KABELTECHNIK	S45035-D651-A701-*-7402
	Blatt — Blätter



1) Mittelschrift 3 DIN 1451 schwarz aufbringen
2) Mittelschrift 3 DIN 1451 weiß aufbringen
3) Ausgabe nach Rel ubc 79 A 86 Bl 2
Herstellungszeichen an beliebiger Stelle

1 Satz Formdrähte
S45035-D652-T1

Le1 90 mm YV 1x10/3,0 grau
Le2 75 mm "

4) blanke Lötanschlüsse mit Schrumpfschlauch RNF Typ 1ws handelsüblich Fa Raychem Stuttgart überziehen und aufschrumpfen (Länge 15 mm)

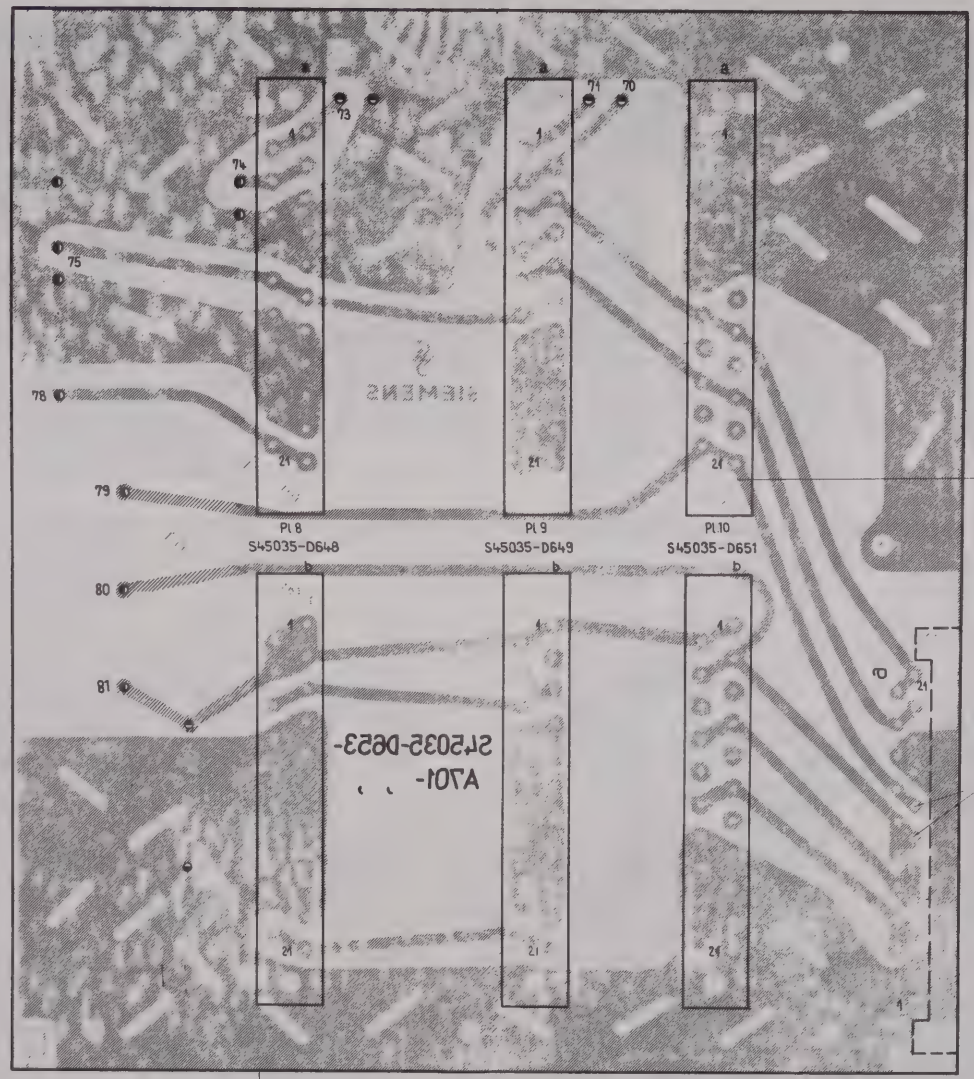
MAINS INPUT
IN D 650 FOR LEVEL METER D 354

Netzeingang
im D 650 für Pegelmesser D 354

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WIDERSTÄNDE FÜR NACHRICHTEN- UND KABELTECHNIK

S45035-D652-A701-x-7402

Ers.f. Rel ms 35 D 652 ala



9.6.68	3		548/2430	
20.7.67	2		547/1897	
21.6.66	2		546/3168	
22.2.66	1			
27.1.66	B			
12.7.65	A		gez. Schüßler	

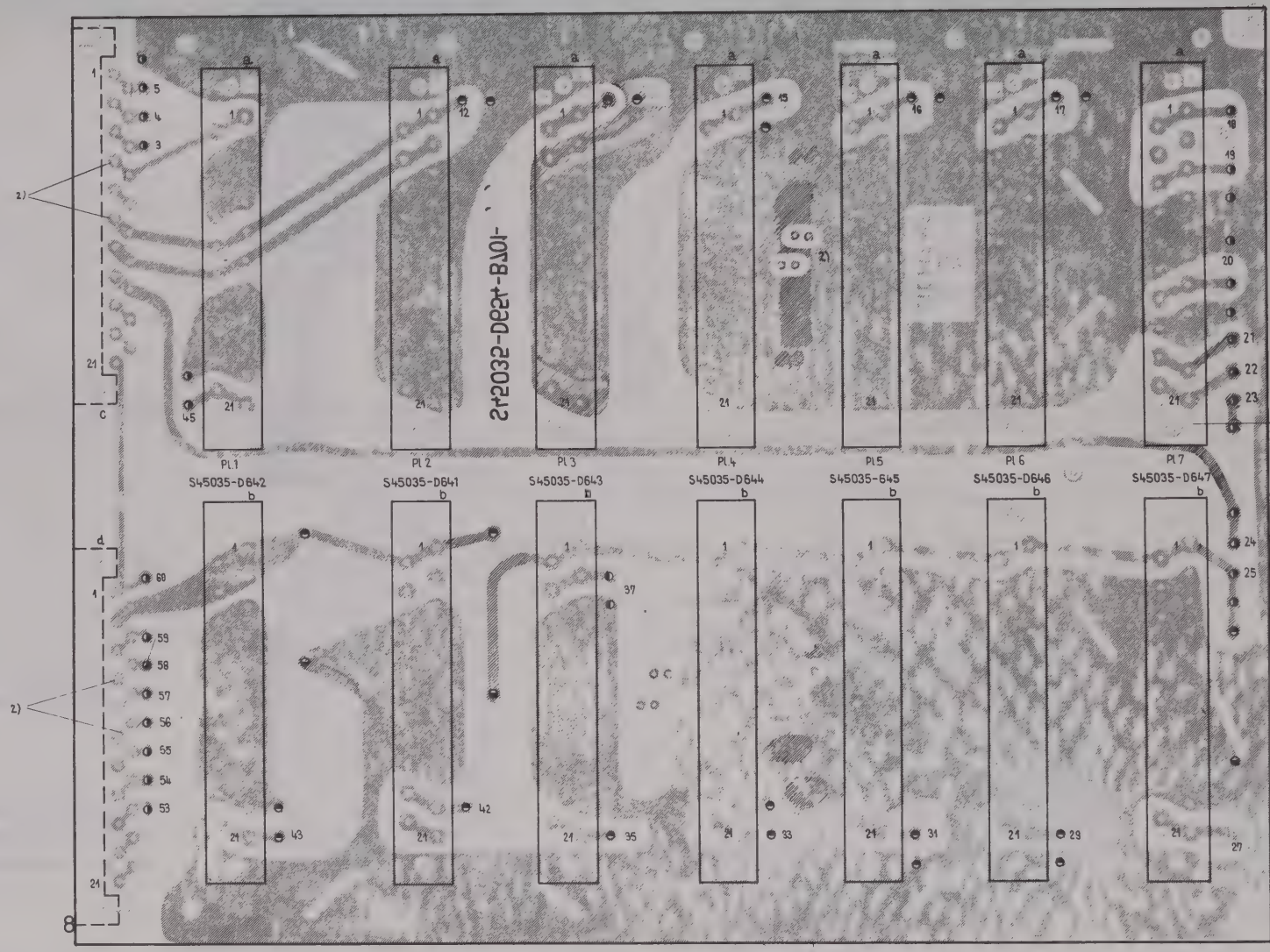
Ers. f. Rel ms 35 D 653 a1a

PRINTED-CIRCUIT BOARD
FOR LEVEL METER D 354

Verdrahtungsleiterplatte II
für Pegelmesser D 354

SIEMENS & HALSKE

S45035-D653-A701-x-7402



Ausg.v.Sk,str,ms

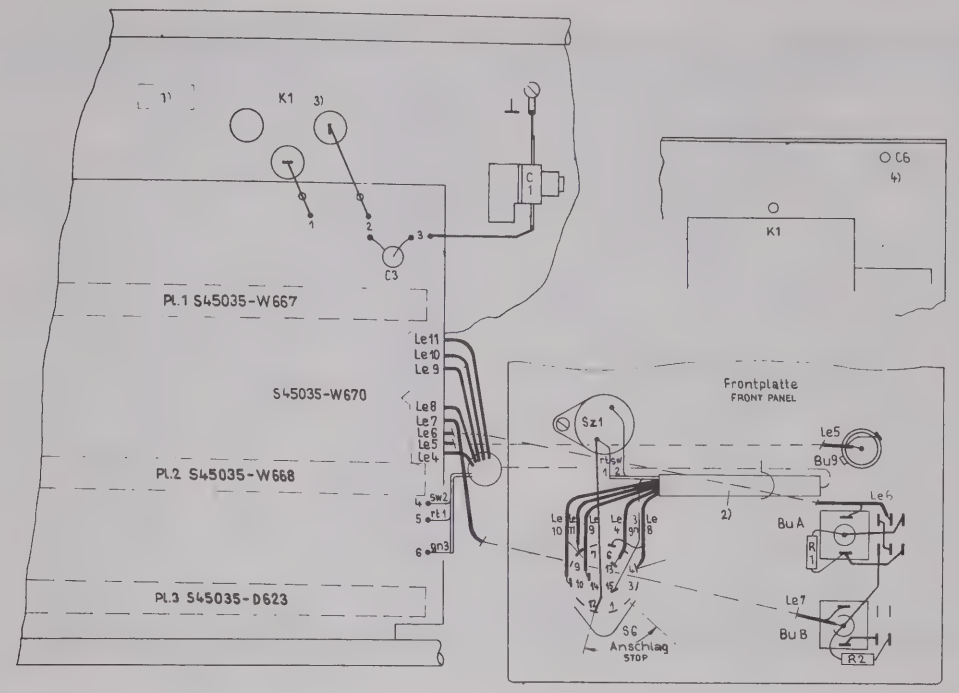
S45035-D654-U2

PRINTED-CIRCUIT BOARD
FOR LEVEL METER D 354

Verdrahtungsleiterplatte I
für Pegelmesser D 354

SIEMENS & HALSKE

S45035-D654-B701-*-7402



1 Satz Formdrähte S45035-D369-T1:

1 rot
2 schwarz } YV 0,5/09
3 grün

Cu. Draht vers. 1,5 ø
Cu. Draht vers. 1,0 ø

1) Ausgabe nach Rel ubc 79 A 86 Bl. 2
Herstellungszeichen
an beliebiger Stelle

2) Vinylanschlauch transp.

3) Drehko bei Linksanschlag v. Antrieb eingedreht

4) Beschriftung in Mittelschrift 3 DIN 1451
schwarz neben Freibohrung des
Schirmblechs aufbringen

Tag	Ausgabe	Mitteilung	Name
25.4.68	3	548/2409	
22.7.67	2	547/1931	
22.2.66	1		
8.2.66	52		
6.7.65	A		gez. Schuhr

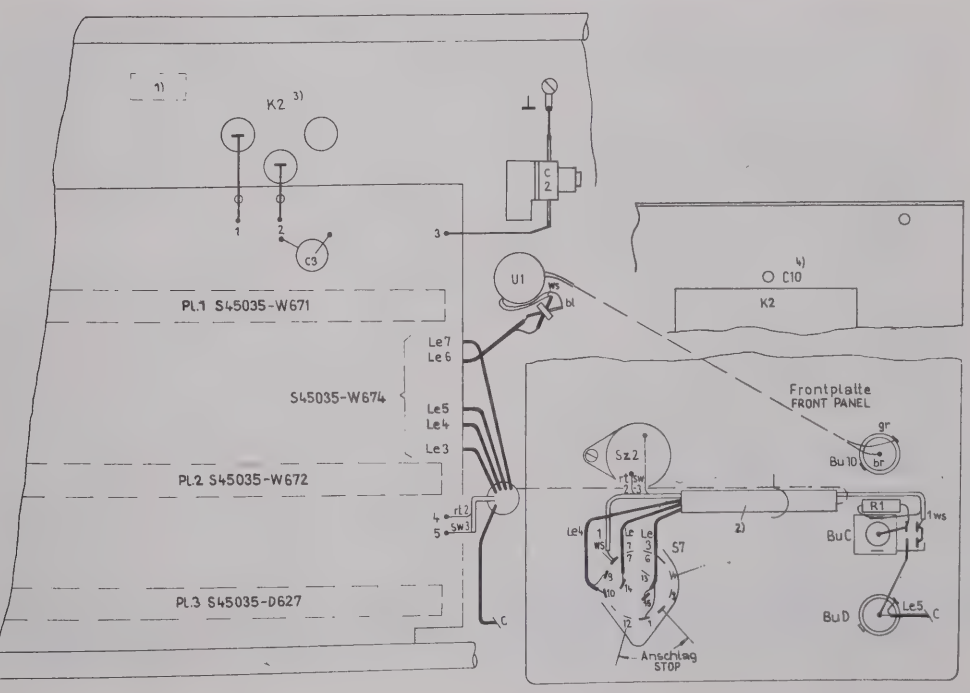
Ers. f. Rel ms 3 D 369 a1a

OSCILLATOR I 0-1600 kHz

Oszillator I 0.. 1600 kHz

SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR MEßTECHNIK UND KABELTECHNIK

S45034-D369-A702-x-7402



1 Satz Formdrähte S45034-D370-T1:

1 weiß W41251-W6187-A75
2 rot } YV 0,5/09
3 schwarz

Cu-Draht vers. 1,5 ø
Cu-Draht vers. 1,0 ø

1) Ausgabe nach Rel ubc 79 A 86 Bl. 2
Herstellungszeichen an beliebiger Stelle

2) Vinylanschlauch transp.

3) Drehko bei Rechtsanschlag v. Antrieb eingedreht

4) Beschriftung in Mittelschrift 3 DIN 1451
schwarz neben Freibohrung des
Schirmblechs aufbringen

Tag	Ausgabe	Mitteilung	Name
27.1.69	4	549/1928	
25.4.68	3	548/2409	
22.7.67	2	547/1931	
22.2.66	1		
8.2.66	52		
6.7.65	A		gez. Schuhr

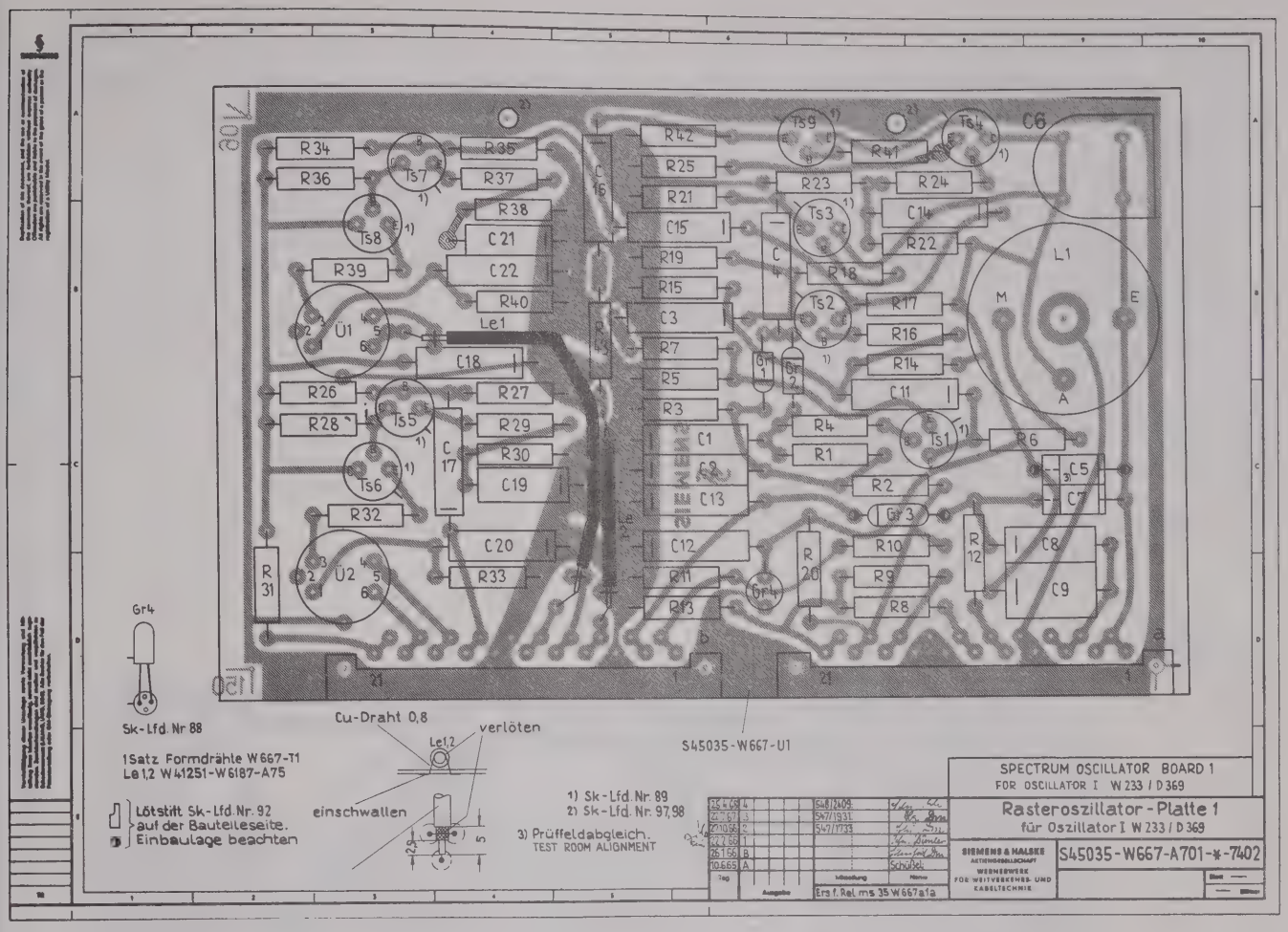
Ers. f. Rel ms 3 D 370 a1a

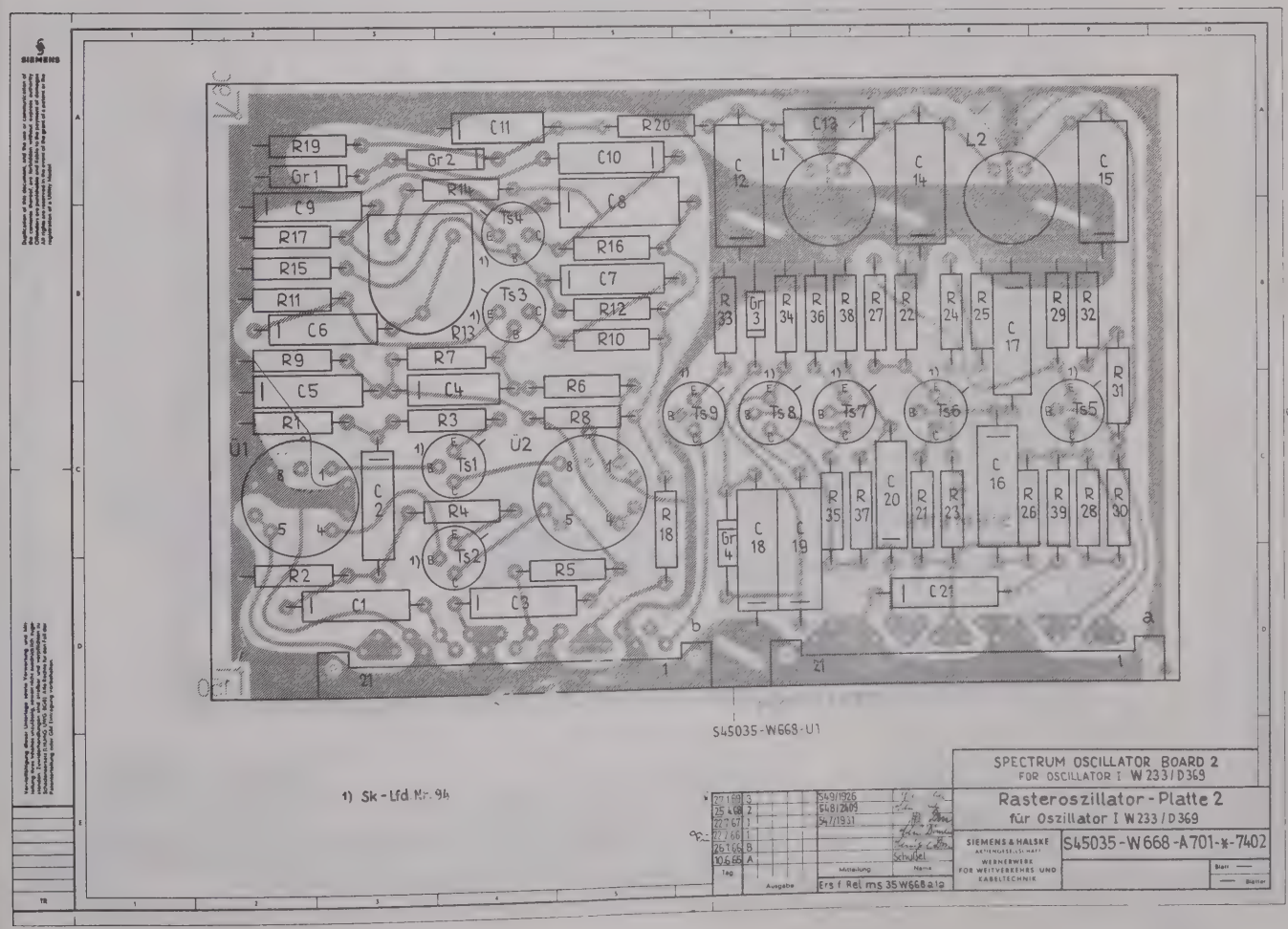
OSCILLATOR II 0-10 kHz

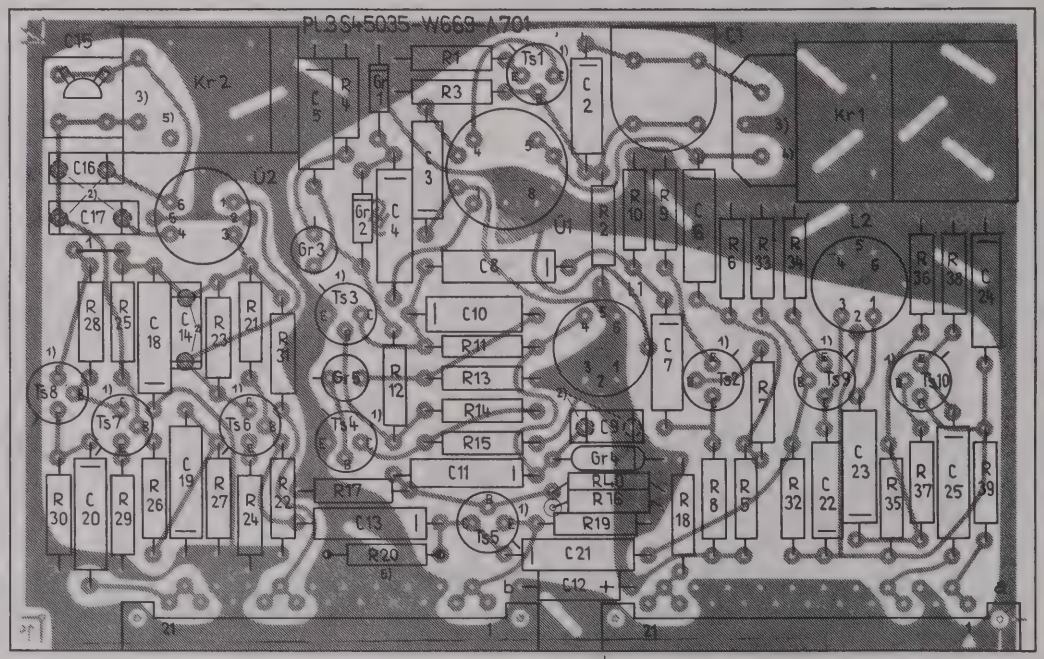
Oszillator II 0-10 kHz

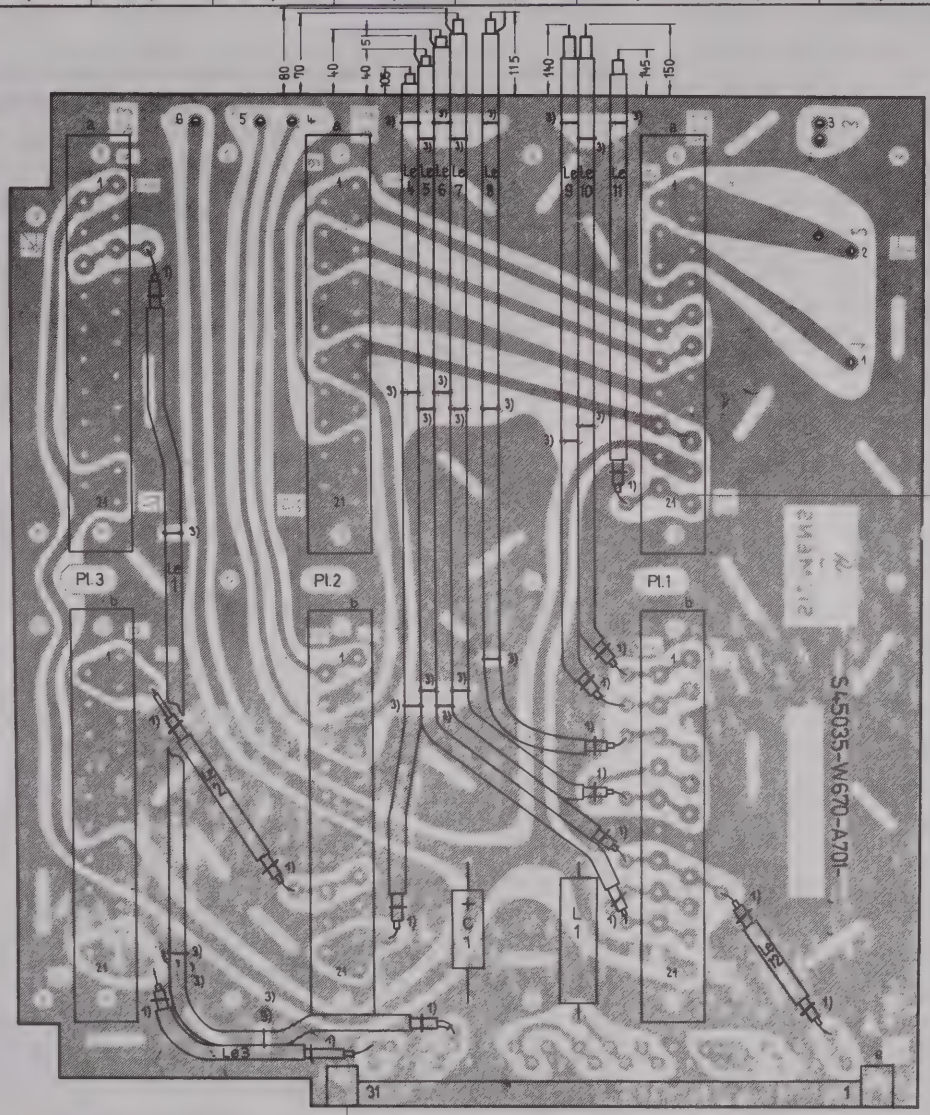
SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR MEßTECHNIK UND KABELTECHNIK

S45034-D370-A702-x-7402


R34
R36
R35
R37
R38
C21
C22
R40
R39
Le1
C18
R26
R28
R27
R29
R30
C19
R32
C20
R33
R31
C17
C16
R42
R25
R21
C15
R19
R15
C3
R7
R5
R3
C1
C8
C13
C12
R11
R43
R20
R41
R23
R24
C14
R22
R18
R17
R16
R14
C11
R4
R1
R2
R10
R9
R8
R12
R6
C5
C7
C9
Ts1
Ts2
Ts3
Ts4
Ts5
Ts6
Ts7
Ts8
Ts9
U1
U2
Gr1
Gr2
Gr3
Gr4
C6
L1
M
E
A
21
1
a
b
Gr4
Sk-Lfd. Nr 88
1 Satz Formdrähle W667-T1
Le 1,2 W41251-W6187-A75
Lötstift Sk-Lfd. Nr. 92
auf der Bauteileseite.
Einbaulage beachten
Cu-Draht 0,8
verlöten
Le1,2
einschwallen
S45035-W667-U1
1) Sk-Lfd. Nr. 89
2) Sk-Lfd. Nr. 97,98
3) Prüffeldabgleich.
TEST ROOM ALIGNMENT
SPECTRUM OSCILLATOR BOARD 1
FOR OSCILLATOR I W 233 / D 369
Rasteroszillator - Platte 1
für Oszillator I W 233 / D 369
SIEMENS & HALSKE
S45035-W667-A701-*-7402
Ers f. Rel ms 35 W667a1a


R19
Gr1
C9
R17
R15
R11
C6
R9
C5
R1
C11
R20
Gr2
C10
R14
C8
R16
C7
R12
R10
R7
C4
R6
R3
R8
R13
C13
L1
L2
C12
C14
C15
R33
Gr3
R34
R36
R38
R27
R22
R24
R25
C17
R29
R32
R31
C2
R4
R2
C1
C3
R5
R18
Gr4
C18
C19
R35
R37
C20
R21
R23
C16
R26
R39
R28
R30
C21
U1
U2
Ts1
Ts2
Ts3
Ts4
Ts5
Ts6
Ts7
Ts8
Ts9
21
1
a
b
S45035-W668-U1
1) Sk-Lfd. Nr. 94
SPECTRUM OSCILLATOR BOARD 2
FOR OSCILLATOR I W 233 / D 369
Rasteroszillator - Platte 2
für Oszillator I W 233 / D 369
SIEMENS & HALSKE
S45035-W668-A701-*-7402
Ers f. Rel ms 35 W668 a1a


PL S45035-W669-A701
C15
Kr 2
C16
C17
U2
Gr 1
R1
R3
Ts1
C 2
C 3
C 5
R 4
C 4
Gr 2
Gr 3
U1
R 2
C8
C10
R11
R13
R14
R15
C11
R17
C13
R20
6)
Ts3
Ts4
Ts5
Gr 4
R 12
C21
C12
Kr 1
L2
L1
R 10
R 9
C 6
R 6
R 33
R 34
R 36
R 38
C 24
C 7
Ts2
R 7
Ts9
Ts10
C9
Gr 5
R16
R19
R 18
R 8
R 5
R 32
C 22
C 23
R 35
R 37
C 25
R 39
R 28
R 25
C 18
C 14
R 23
R 21
R 31
Ts8
Ts7
Ts6
C 19
R 27
R 24
R 22
R 30
C 20
R 29
R 26
21
1
S45035-W669-U1
Gr 3,5
Sk - Lfd. Nr. 115
3) Anschlußdrähte der Fassung, der Skizze entsprechend ausformen
4) Sk-Lfd. Nr. 112
5) Sk-Lfd. Nr. 113
1) Sk - Lfd. Nr. 116
2) Isolierperle Sk Lfd. Nr. 121
Lötstift Sk Lfd. Nr. 122
Einbaulage beachten
6) Prüffeldabgleich
Ers. f. Rel. mit 35 W669 a1a
SPECTRUM OSCILLATOR BOARD 3
FOR OSCILLATOR I W 233 / D 369
Rasteroszillator - Platte 3
für Oszillator I W233 / D369
SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR TELEGRAFEN- UND SIGNALTECHNIK
S45035-W669-A701-*-7402

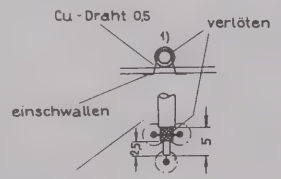


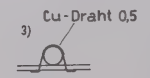
C44326 - A14 - B28 beachten

Lötstift Sk -Lfd.Nr.18 auf der Leiterseite Einbaulage beachten

Ausgabe von Sk.str.ms

1 Satz Formdrähte S45035-W670-T1:
Le1...Le12 W41251-W6187-A75





freie Leitungsenden der Le4-11
mit Schrumpfschlauch überziehen

2) Beschriftung in Mittelschrift 3 DIN 1451
schwarz aufbringen
Herstellungszeichen an beliebiger Stelle

PRINTED CIRCUIT BOARD
FOR OSCILLATOR I W 233/ D 369

Verdrahtungsleiterplatte
für Oszillator I W 233/ 0369

SIEMENS & HALSKE

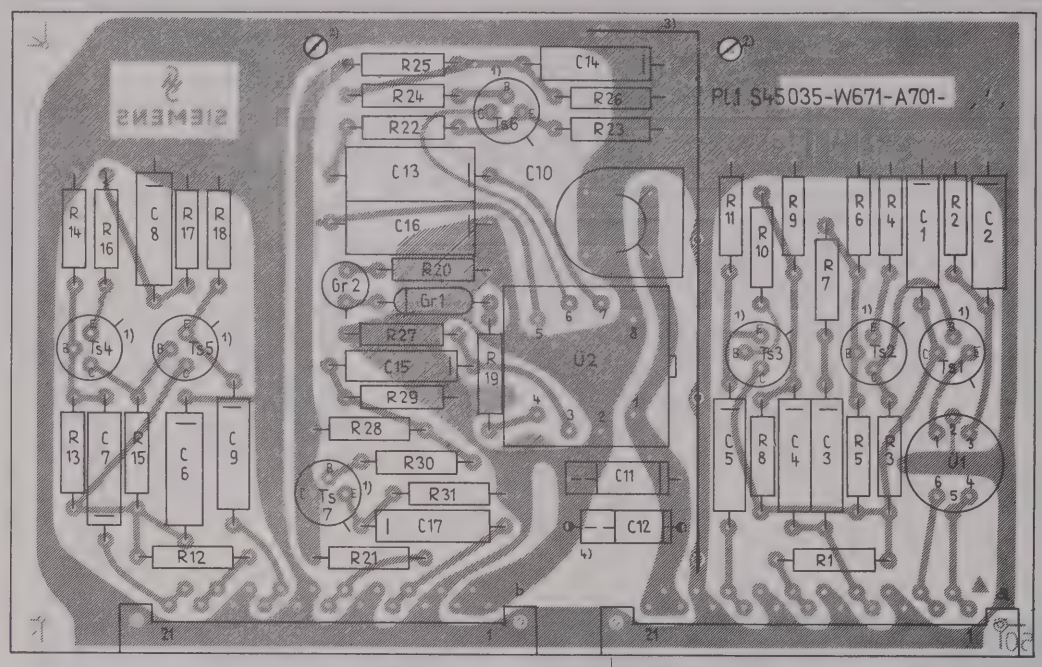
S45035-W670-A701-*-7402

25.4.66	4		548/2408	
12.7.67	3		547/1931	
27.10.66	2		547/1733	
22.2.66	1			
27.1.66	B			
12.7.65	A			
Tag		Änderung	Name	

gez. Schüssel

Ers.f.Rel.ms 35 W670 a1a

26.1.66



S45035-W671-U1

Gr 2

Sk lfd.Nr. 88

Lötstift Sk-lfd Nr 92 auf Bauteileseite Einbaulage beachten

1) Sk lfd.Nr. 89
2) Sk lfd Nr. 97,98 (Säule auf Leiterseite)
3) Sk lfd.Nr. 5
4) Prüffeldabgleich
TEST ROOM ALIGNMENT

Tag	Ausgabe	Mitteilung	Name	
25.4.68	4	548/2409		
22.7.67	3	547/1931		
6.7.65	2	545/3197		
27.2.68	1			
26.1.68	B			
10.6.65	A			

Ers.f. Rel ms 35 W 671 a1a

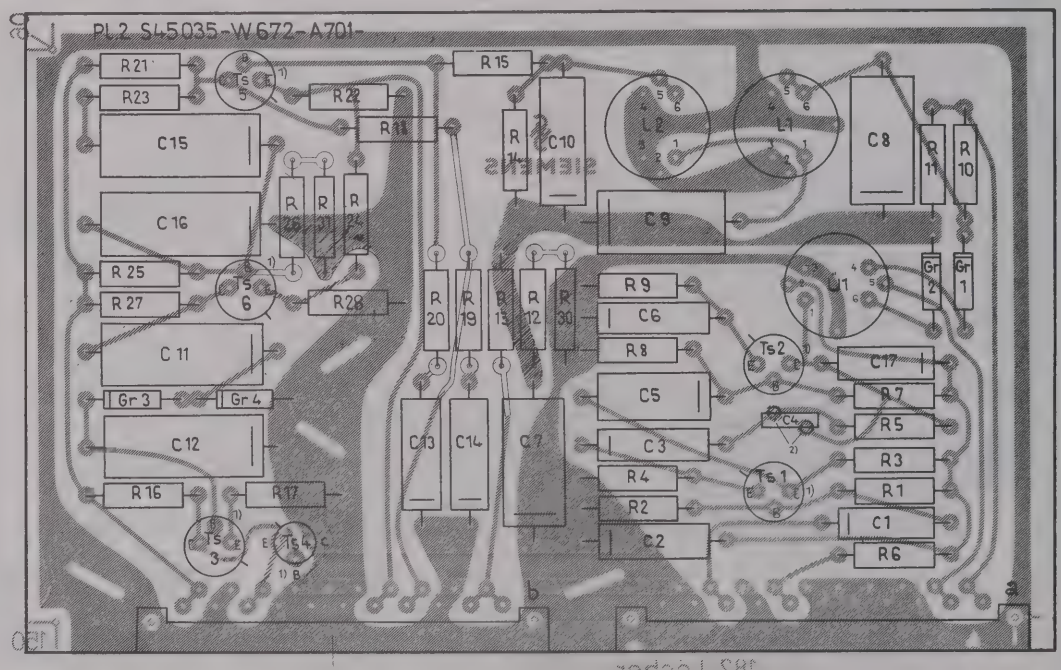
INTERPOLATOR BOARD 1

Interpolator - Platte 1
für W 234/D 370

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR TELEGRAFEN- UND SIGNALTECHNIK

S45035-W671-A701-*-7402

Start
Stärker



S45035-W672-U1

1) Sk lfd.Nr 87
2) Isolierperle Sk lfd.Nr. 92

Tag	Ausgabe	Mitteilung	Name	
25.4.68	3	548/2409		
22.7.67	2	547/1931		
27.2.68	1			
26.1.68	B			
23.2.65	A			

Ers.f. Rel ms 35 W 672 a1a

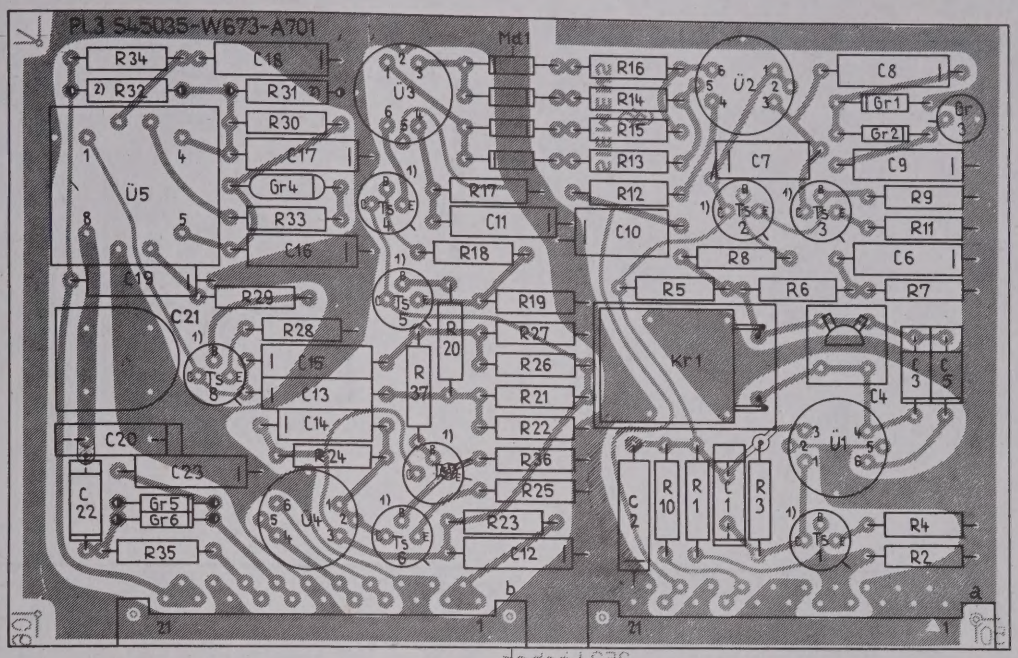
INTERPOLATOR BOARD 2

Interpolator – Platte 2
für W 234, D 370

SIEMENS & HALSKE AKTIENGESELLSCHAFT
WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK

S45035-W672-A701-*-7402

Start
Stärker



S45035-W673-U1

3)

Anschlußdrähte der Fassung, der Skizze entsprechend ausformen
Sk-Lfd.Nr. 112

Gr 3

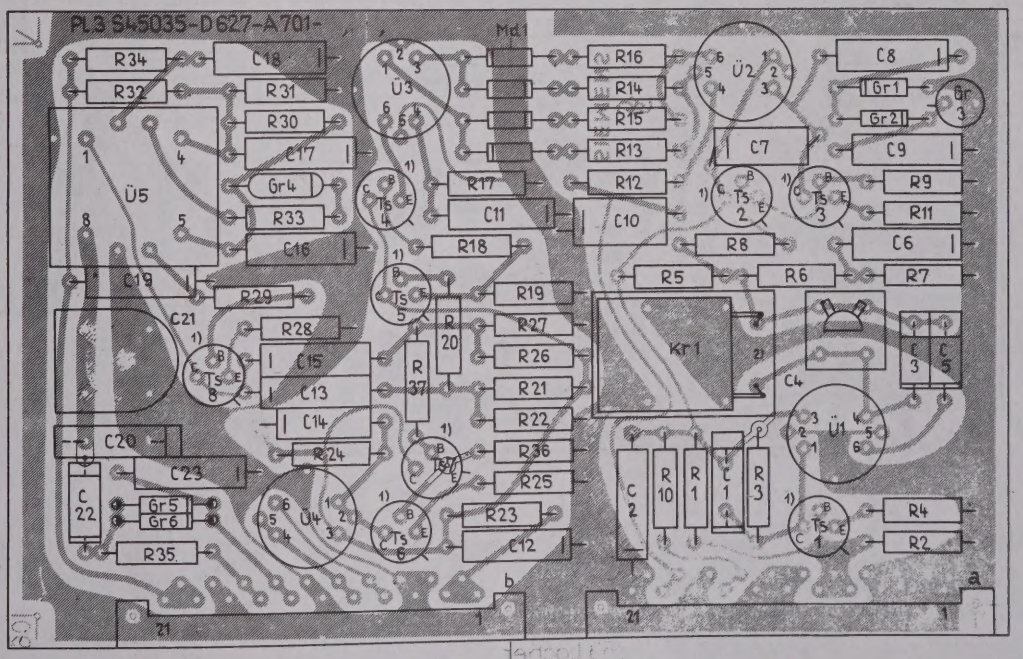
Sk lfd.Nr.115

Lötstift Sk-lfd.Nr.121
Einbaulage beachten

1) Sk lfd-Nr. 116

2) Prüffeldabgleich
TEST ROOM ALIGNMENT
auf Leiterplatte aufliegend einbauen.

25458	4	548/2409	Schüßel	INTERPOLATOR BOARD 3	
10665	A			Interpolator-Platte 3 für W 234	
Tag		Ausgabe	Mitteilung / Name	SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK	S45035-W673-A701-*-7402
			Ers.f. Rel.ms 35 W 673 a1a		Blatt — Blätter —



S45035-D627-U1

Gr 3

Sk-Lfd.Nr 115

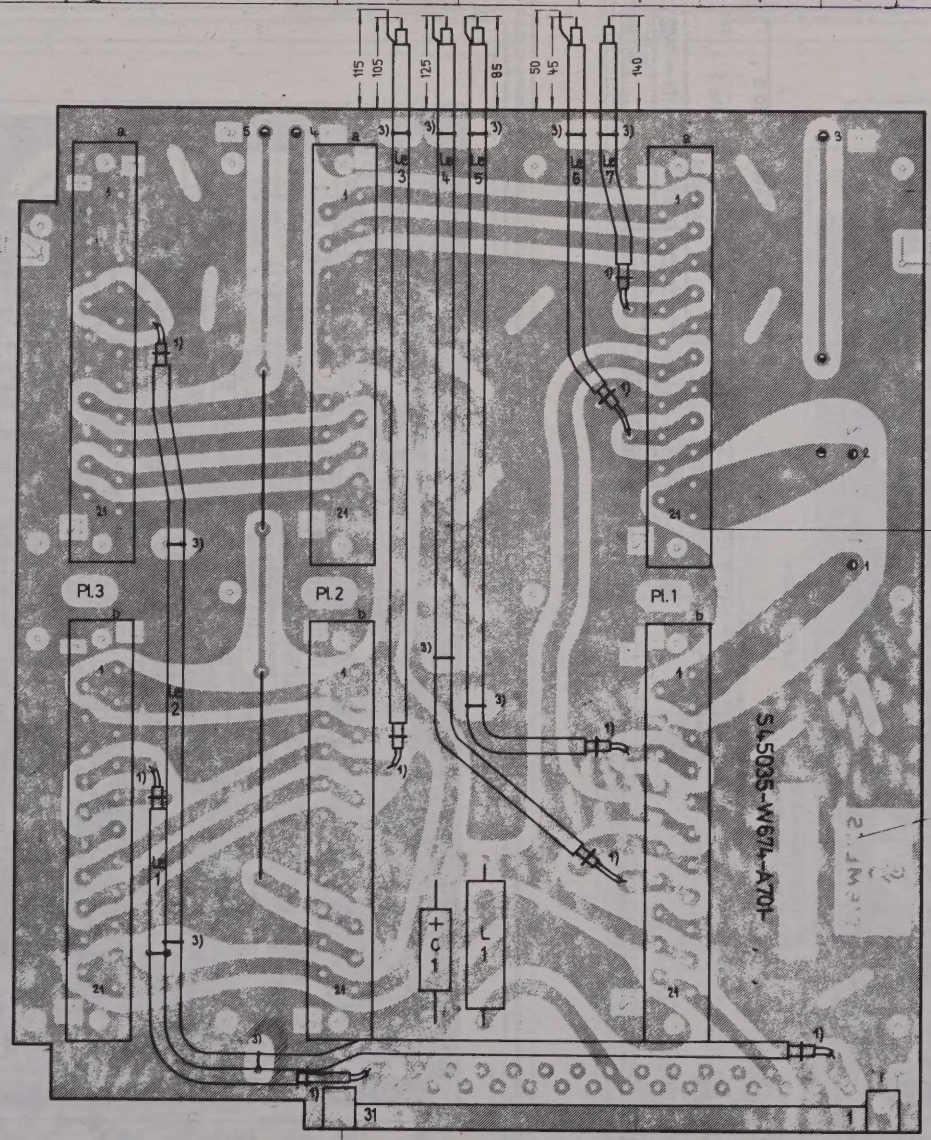
Lötstift Sk-Lfd. Nr. 121
Einbaulage beachten

1) Sk-lfd.Nr. 116

2)

Anschlußdrähte der Fassung, der Skizze entsprechend ausformen
Sk-Lfd. Nr. 112

25458	3	548/2409		INTERPOLATOR-BOARD 3	
22767	2	547/1931		Interpolator-Platte 3 für D 370	
7.11.66	1				
Tag		Ausgabe	Mitteilung / Name	SIEMENS & HALSKE AKTIENGESELLSCHAFT WERNERWERK FÜR WEITVERKEHRS- UND KABELTECHNIK	S45035-D627-A701-*-7402
			Ers.f. Rel.ms 35 D 627 a1a		Blatt — Blätter —

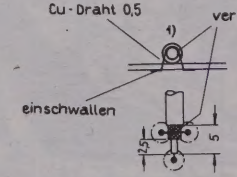


C44326 - A14 - B28 beachten

Lötstift Sk-lfd.Nr.18 auf der Leiterseite
Einbaulage beachten

Ausgabe von Sk.str.ms

1 Satz Formdrähte S45035-W674-T1:
Le1...Le7 W41251-W6187-A75



freie Leitungsenden der Le3-Le7
mit Schrumpfschlauch überziehen

2) Beschriftung in Mittelschrift 3 DIN 1451
schwarz aufbringen
Herstellungszeichen an beliebiger Stelle

25.4.68	4		S48/2418	
22.7.67	3		S47/1931	
5.7.66	2		S46/3197	
FA 28.2.66	1			
27.1.65	B			
23.6.65	A			
Tag		Änderung	Name	
		Ers. f. Rel.	35 W 674 a 1a	

gez. Schüttel

26.1.66

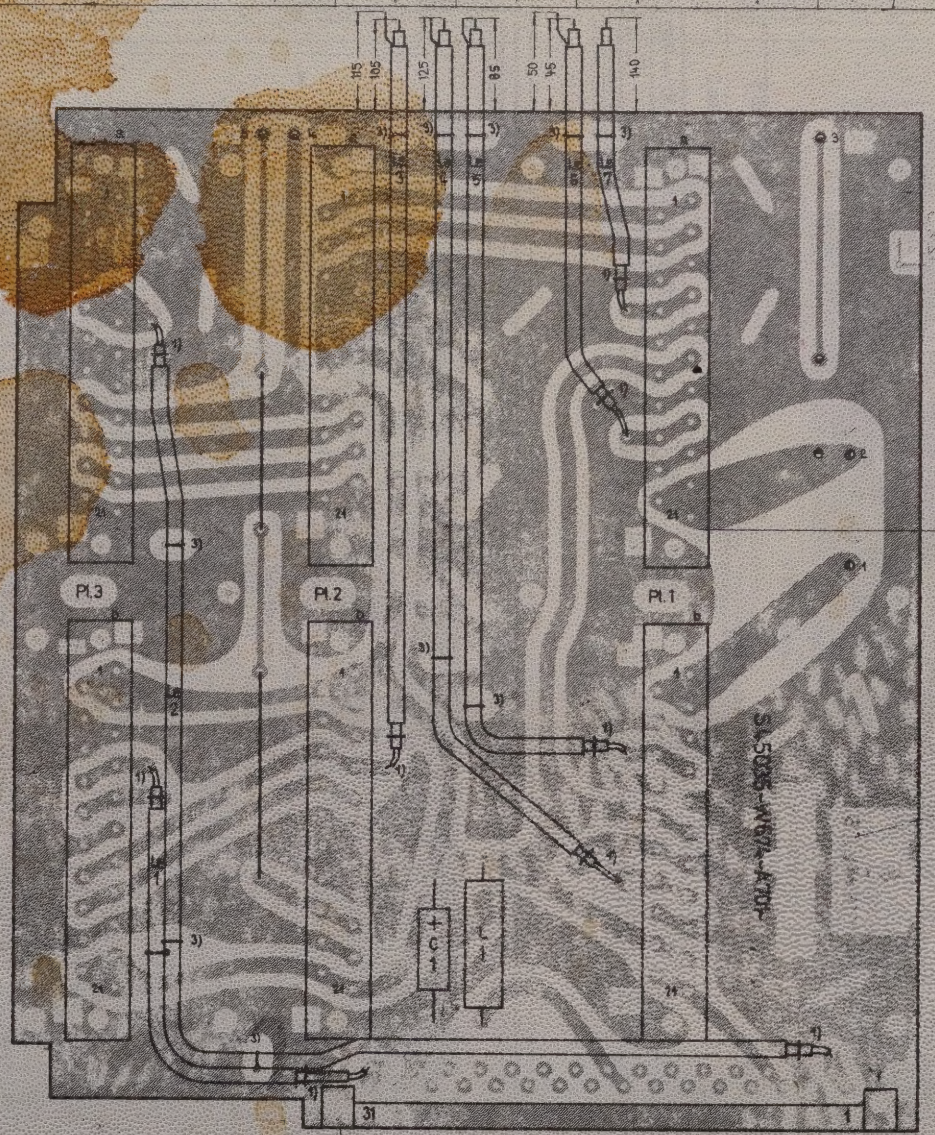
PRINTED CIRCUIT BOARD
FOR OSCILLATOR II W 234/ D 370

Verdrahtungsleiterplatte
für Oszillator II W 234/ D 370

SIEMENS & HALSKE
WERNERWERK FÜR MESSTECHNIK

S45035-W674-A701-*-7402

Stahl —
— Basis



C44328 - A14 - B28 beachten

Lötstift Sk-Ufd.Nr.18 auf der Leiterseite
Einbaulage beachten

Ausgabe von Sk str.ms

15stx Pfostenstifte S45035-W674-T1
Lei. Le? W41251-W6187-A95

Cu-Draht 0.5 verlöten

Einschwalen

3) Cu-Draht 0.5

freie Leitungsenden der Le3-Le7
mit Schrumpfschlauch überziehen

2) Beschriftung in Mittelschrift 3 DIN 1451
schwarz aufbringen
Herstellungszeichen an beliebiger Stelle

PRINTED CIRCUIT BOARD
FOR OSCILLATOR II W234/ 0370

Verdrahtungsleiterplatte
für Oszillator II W234/ 0370

S45035-W674-A701-x-7402